

SINGLE STAGE EXPERIMENTAL EVALUATION  
OF  
VARIABLE GEOMETRY GUIDE VANES  
AND STATOR BLADING

PART V - OVERALL PERFORMANCE FOR VARIABLE  
CAMBER GUIDE VANE AND STATOR B WITH RADIAL  
AND CIRCUMFERENTIAL INLET FLOW DISTORTION

BY

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SUMMARY

A single stage experimental investigation of a variable camber inlet guide vane, rotor, and variable geometry stator was conducted to determine the influence of radial and circumferential inlet flow distortion on the stage overall performance characteristics and stall margin. Tests were conducted with two settings of the variable camber guide vane, referred to as sea level takeoff (SLTO) and cruise configurations. Both configurations were tested at 70, 80, and 100% of the SLTO design equivalent rotor speed. The 70% speed condition was the design cruise rotor speed and corresponds to a supersonic flight Mach number of approximately three.

The stage had a hub/tip ratio of approximately 0.5 and a tip diameter of approximately 43 inches, and in general resembled the front stage of a compressor for a high cruise flight Mach number engine. The variable geometry guide vane was designed with 63-Series airfoils and comprised a fixed forward segment and two articulated flaps. The rotor was designed with circular arc airfoils and had a tip inlet relative Mach number of 1.15. The variable geometry stator was designed with 65-Series airfoils and comprised two adjustable segments that permitted variation of the leading and trailing edge metal angles.

When operating at SLTO design rotor speed in the SLTO configuration, the radial and circumferential distortion resulted in 29 and 40% reductions in stall margin, respectively. At cruise rotor speed with radial distortion the stall margin for the cruise configuration was 16.5% greater

than that for the SLTO configuration with distortion. The stall margin of the cruise configuration at cruise rotor speed with circumferential distortion was 19% greater than that for the SLTO configuration with distortion. The circumferential distortion caused a slightly greater loss in stage efficiency than the radial distortion.

#### INTRODUCTION

The decrease in compressor inlet flow and, hence, axial velocity between the sea level takeoff (SLTO) design point and the cruise design point of high flight Mach number turbojet engines imposes a wide incidence angle operating range requirement on the compressor front stage rotor. Distortion of the compressor inlet flow can result from aircraft/engine inlet flow nonuniformities and/or flow instabilities. Distortion will result in further reduction in local inlet axial velocity and, consequently, further increase in local incidence angle to levels that may result in significant loss in compressor efficiency and stall margin.

An experimental investigation was conducted with a single stage compressor to evaluate the extent that variable geometry concepts for inlet guide vanes and stators can be applied to provide adjustment of the blade section velocity triangles and thereby increase the stable operating range of compressor front stages. A variable camber inlet guide vane, rotor, and two variable-geometry stator configurations (designated Stator A and Stator B) were designed, fabricated, and tested with uniform inlet flow over a range of equivalent rotor speeds from 50 to 110% of the SLTO design rotor speed. Overall and blade element performance data for the undistorted inlet flow tests of the Stator A and Stator B stages are presented in References 2 and 3, respectively. The stage with Stator B was selected for subsequent overall performance tests with (1) circumferentially distorted inlet flow generated by means of a 90-degree sector distortion screen and (2) radially distorted inlet flow generated by means of a 360-degree radial distortion screen that covered 40% of the outer annulus area. The distortion screen porosity was selected to provide a total pressure drop of 7% at a stage inlet Mach number of 0.42. Tests with the two distorted inlet flow conditions were conducted with

two settings of the variable camber guide vane and variable geometry stator blading referred to as SLTO and cruise configurations. The cruise rotative speed was selected as 70% of the SLTO value and corresponds to a supersonic flight Mach number of approximately three.

Details of the aerodynamic and mechanical design of the stage blading and compressor rig are presented in Reference 1. This report presents the overall performance results obtained with the Stator B stage operating with circumferential and radial inlet flow distortion.

#### TEST EQUIPMENT

##### Facility

Details of the compressor research facility, test rig, blading design, and instrumentation for the tests with undistorted inlet flow are presented in References 1 and 3. A description of the test equipment particular to the distorted inlet flow test program is presented below.

##### Variable-Geometry Stage Description

A sketch of the variable-geometry stage is shown in figure 1 and pertinent flowpath dimensions are shown in figure 2.

Two design settings of the variable camber inlet guide vane and variable-geometry stator blading are referred to as sea level takeoff (SLTO) and cruise configurations. The SLTO configuration was designed to provide axial inlet flow (zero rotor prewhirl) at the exit of the inlet guide vane and near-axial stator exit flow. The cruise configuration was designed to provide 35-degree hub/20-degree tip rotor prewhirl and 30-degree hub/25-degree tip stator exit air angle distribution. The variable camber guide vane comprised a fixed leading edge segment and two articulated flap segments. The variable-geometry stator had adjustable leading and trailing edge metal angles by virtue of two variable-chord-angle segments. Photographs and section views of the guide vane and stator are shown in figure 3 to illustrate the SLTO and cruise configurations. Geometry details of the variable-camber inlet guide vane, rotor, and Stator B are summarized in table 1a, 1b, and 1c. Symbols and performance variables are defined in Appendix A.

Table 1. Design Data

## a. Inlet Guide Vane Geometry

Airfoil Series: 63  
 No. of Blades: 20  
 Aspect Ratio: 2.642  
 Thickness Ratio: 0.09

SLTO Configuration

Percent Span (from tip)	$\kappa_1$	$\kappa_2$	$\phi$	$\gamma^\circ$	c	$\sigma$	$\delta^\circ$
90	-20.2	5.4	25.6	1.2	4.55	1.412	Approximately
70	-20.2	3.7	23.9	0.5	4.55	1.245	1.0 Degree
50	-20.2	1.9	22.1	-0.2	4.55	1.080	Estimated
30	-20.2	0.3	20.5	-0.9	4.55	0.913	
10	-20.2	-1.6	18.6	-1.6	4.55	0.748	

Cruise Configuration

Percent Span (from tip)	$\kappa_1$	$\kappa_2$	$\phi$	$\gamma^\circ$	c	$\sigma$	$\delta^\circ$
90	-20.2	36.0	56.2	21.1	4.47	1.412	2.2
70	-20.2	34.3	54.5	20.5	4.47	1.245	3.2
50	-20.2	32.5	52.7	19.9	4.47	1.080	4.3
30	-20.2	30.9	51.1	19.2	4.47	0.913	5.9
10	-20.2	29.0	49.2	18.5	4.47	0.748	7.1

Table 1. Design Data (Continued)

## b. Rotor Geometry

Airfoil Series: Circular Arc  
 No. of Blades: 34  
 Aspect Ratio: 2.829

SLTO Configuration

Percent Span (from tip)	$\kappa_1$	$\kappa_2$	$\phi$	$\gamma^\circ$	$i_m$	c	$\sigma$	t/c	$\delta$	$\bar{\omega}'$
90	48.6	18.8	29.8	31.2	1.4	3.24	1.42	0.0744	6.1	0.024
70	52.5	32.5	20.0	41.2	1.4	3.43	1.30	0.0641	4.3	0.024
50	56.1	42.1	14.0	48.2	1.2	3.63	1.20	0.0542	3.8	0.033
30	59.6	48.6	11.0	53.6	0.4	3.82	1.12	0.0445	3.3	0.058
10	63.2	52.9	10.3	57.9	0.0	4.01	1.06	0.0355	3.8	0.097

Cruise Configuration

Percent Span (from tip)	$\kappa_1$	$\kappa_2$	$\phi$	$\gamma^\circ$	$i_m$	c	$\sigma$	t/c	$\delta$	$\bar{\omega}'$
90	Same as SLTO Configuration				-1.7	Same as SLTO Configuration		6.2	0.030	
70	Same as SLTO Configuration				2.3	Same as SLTO Configuration		4.3	0.018	
50	Same as SLTO Configuration				4.3	Same as SLTO Configuration		2.9	0.030	
30	Same as SLTO Configuration				4.9	Same as SLTO Configuration		2.3	0.064	
10	Same as SLTO Configuration				4.5	Same as SLTO Configuration		2.5	0.125	

Table 1. Design Data (Continued)

## c. Stator B Geometry

Airfoil Series: . 65  
 No. of Blades: 40  
 Aspect Ratio: 2.939  
 Thickness Ratio: 0.08

SLTO Configuration

Percent Span (from tip)	$\kappa_1$	$\kappa_2$	$\phi$	$\gamma^\circ$	$i_m$	c	$\sigma$	$\delta^\circ$	$\bar{\omega}$
90	40.9	-8.7	49.6	16.0	-4.2	2.75	1.28	12.8	0.026
70	37.1	-7.5	44.6	14.5	-3.3	2.88	1.19	10.1	0.025
50	34.7	-7.5	42.2	13.5	-3.2	3.00	1.12	9.3	0.026
30	34.0	-8.0	42.0	13.2	-3.2	3.13	1.07	9.8	0.029
10	36.0	-8.9	44.9	13.5	-4.8	3.27	1.02	11.0	0.032

Cruise Configuration

Percent Span (from tip)	$\kappa_1$	$\kappa_2$	$\phi$	$\gamma^\circ$	$i_m$	c	$\sigma$	$\delta^\circ$	$\bar{\omega}$
90	49.9	17.3	----	----	-2.2	----	1.28	11.9	0.040
70	46.1	18.5	----	----	1.7	----	1.19	9.0	0.038
50	43.7	18.5	----	----	3.2	----	1.12	8.2	0.030
30	43.0	18.0	----	----	3.2	----	1.07	8.4	0.024
10	45.0	17.1	----	----	1.2	----	1.02	9.3	0.027

### Distortion Screens

Two distortion screens were designed and fabricated for these tests: one 90-degree sector screen for circumferential distortion of the inlet flow, and one 360-degree screen that covered the outer 40% annulus area for radial distortion of the inlet flow. The screens were designed to provide a total pressure loss,

$$\frac{P_{\max} - P_{\min}}{P_{\max}} = 0.067.$$

This total pressure loss gave the same axial velocity distortion at the rig design inlet Mach number of 0.42 (at the screen location) as that calculated for a total pressure loss of .0.15 at a Mach number of 0.6. The required screen porosity was obtained as a function of  $(P_{\max} - P_{\min})/q_{\text{avg}}$  and  $M_{\text{avg}}$  from Reference 4. The terms  $q_{\text{avg}}$  and  $M_{\text{avg}}$  refer to the average velocity equivalent pressure and Mach number immediately downstream of the screen. Both screens had a 0.028-inch diameter wire on a 4 mesh.

The screen was located 9.7 inches upstream of the inlet guide vane leading edge, as shown in figure 2. Photographs showing the radial and circumferential distortion screens are presented in figures 4 and 5, respectively.

### Instrumentation

Overall performance with distorted inlet flow was based on measurements obtained at Instrumentation Stations 0 and 2A, shown in figures 1 and 2. Four radial rakes spaced approximately 90 degrees apart and having Kiel type total pressure sensors at the 10, 30, 50, 70, and 90% span positions (from the outer wall) were located at Station 0. Four approximately equally spaced wall pressure taps were provided on both the inner and outer wall at Station 0 for static pressure measurement. The circumferential locations of these instruments relative to the 90-degree distortion screen are shown in figure 6. Weight flow was measured using an orifice in the inlet duct, and inlet temperature was measured in the inlet plenum chamber. Rotor speed was measured by means of an electromagnetic sensor.

The circumferential locations of instruments at Station 2A are shown in figure 7. Stage exit total pressure was measured by means of circumferential rake probes. For the radial distortion, two probes were used; one probe had three 14-tube rakes at 10, 50, and 90% span and the other probe had two 14-tube rakes at 30 and 70% span. These probes were positioned 18 degrees apart. A third probe having two 14-tube rakes at 30 and 70% span was installed for the circumferential distortion test. This probe was located in the expected region of distorted flow at Station 2A as shown in figure 7. The probe was repositioned radially for each test point to cover the 10, 30, 50, 70, and 90% span locations. The three rake probes could also be repositioned in circumferential slots to keep the stator wakes approximately centered on the rakes when the stator geometry was changed from the SLT0 to the cruise configuration. Two Kiel head radial rakes were also used at Station 2A for total pressure measurement. One rake was connected to manometers for the purpose of setting pressure ratio conditions and the other rake was close-coupled to fast response pressure transducers for stall transient total pressure measurements. For the circumferential distortion tests an additional radial rake was installed to provide stall transient measurements in the distorted as well as in the undistorted flow region. Static pressure at Station 2A was measured by means of four static pressure taps on the inner and outer wall, located as shown in figure 7.

Stage exit temperature was measured by means of four radial total temperature rakes spaced approximately 90 degrees apart. The data recording system is described in Reference 3.

## PROCEDURES

### Test Procedure

Overall performance data were obtained for the SLT0 and cruise geometry configurations of the variable-geometry stage at rotor speeds of 70, 80, and 100% of the design equivalent rotor speed. Four data points were recorded at each rotor speed to define the stage characteristic from choke to stall. The approximate steady-state stall point was determined from rotor blade strain gage output monitored on oscilloscopes and stage exit total pressure indicated on manometers. The near stall point was set as close to the stall flow as practical.

Transient measurements of orifice pressures, stage inlet and exit total pressures, and rotor speed were obtained at the rate of 600 samples per minute as the stage was operated into and out of stall at each rotor speed to precisely define the stall point. This procedure is described in more detail in Reference 3.

### Data Reduction Procedure

Two different methods of data reduction were utilized to calculate overall performance for the radial and the circumferential distortion configurations. For the radial distortion, the method described in Reference 2 was used with the exception that stage inlet total pressure was the mass flow average value calculated from the Station 0 radial rake total pressure data rather than the plenum pressure. Linear interpolation between the Station 0 inner and outer wall static pressures was used to define local Mach number and weight flow. Stage exit pressure was obtained by mass-flow averaging the wake probe data first circumferentially at each span location (to define the radial profile) and then mass-flow averaging radially. Linear interpolation between inner and outer wall static pressure data was used to define local Mach number and weight flow at Station 2A.

The stage exit average temperature was obtained by arithmetically averaging the four radial rake temperature measurements at each of five span locations to obtain a radial profile, and subsequently calculating the mass-flow average of the radial profile.

All of the pressure and temperature data were corrected to NASA standard conditions.

Because the existing data reduction computer programs were not designed to handle an asymmetric flow distribution, a separate computer program was prepared for calculation of overall performance for the circumferential (90-degree sector screen) distortion configuration. Two sets of radial profiles of total pressure and total temperature were generated by means of the instrumentation located in and out of the distorted flow regions at Stations 0 and 2A. The radial static pressure distributions at Station 0 and 2A were based on linear interpolation of the appropriate inner and outer wall static pressures. Mass-flow average values of total pressure and total temperature were thus obtained for the distorted and undistorted flow. Assuming that the circumferential distribution of distorted and undistorted flow maintained approximately the same proportion between Station 0 and Station 2A, the overall average pressures and temperatures were obtained on an area-weighted basis as follows:

$$\bar{P}_0 = \frac{(3) \bar{P}_{0 \text{ undistorted}} + (1) \bar{P}_{0 \text{ distorted}}}{4}$$

$$\bar{P}_{2A} = \frac{(3) \bar{P}_{2A \text{ undistorted}} + (1) \bar{P}_{2A \text{ distorted}}}{4}$$

and

$$\bar{T}_{2A} = \frac{(3) \bar{T}_{2A \text{ undistorted}} + (1) \bar{T}_{2A \text{ distorted}}}{4}$$

#### PRESENTATION OF DATA

##### Distortion Screen Total Pressure Loss

The total pressure loss achieved with the radial and circumferential distortion screens is presented in figure 8. The design values of total pressure loss for inlet Mach numbers of 0.6 and 0.42 are shown for comparison with the data. The measured total pressure loss for both screen configurations is in good agreement with the design pressure loss of 0.067 for a Mach number of 0.42. A reasonable extrapolation of the data includes the design pressure loss of 0.15 for an inlet Mach number of 0.6. The data curves approximate lines of constant axial velocity

ratio across the screens. Typical radial and circumferential distributions of total and static pressure at Station 0 obtained with the two distortion screens are shown in figures 9 and 10, respectively. Static pressure distributions for undistorted flow are included for comparison. The Mach numbers in figures 8 through 10 refer to the high pressure flow region.

#### Overall Performance

Stage pressure ratio and adiabatic efficiencies obtained with the radially distorted inlet flow are presented in figure 11 for the SLTO configuration and figure 12 for the cruise configuration. Overall performance results for the circumferentially distorted inlet flow are presented in figures 13 and 14 for the SLTO and cruise configurations, respectively. In each figure the stall line and the data points on the stall line were obtained from stall transient data. Pressure ratio and efficiency obtained with undistorted inlet flow (Reference 3) are included in the figures for comparative purposes. In general, the pressure rise characteristics in figures 11 through 14 indicate a significant change in the stall line at high rotor speeds and very little change at the low rotor speed. The stall lines for the SLTO and cruise configurations with undistorted and distorted inlet flow are compared in figure 15. The SLTO configuration stage peak efficiency in figure 11 does not appear to be affected by the radial distortion. The cruise configuration peak efficiency shown in figure 12 is down approximately 2 points. The circumferential distortion affected the peak efficiencies of both the SLTO and cruise configurations, with the largest reduction in efficiency, about 5 points, occurring with the cruise configuration. No firm conclusions can be drawn with respect to efficiency because of the simplified techniques used in averaging for circumferential distortion.

The influence of the two distortion conditions on the stall margins was evaluated on the basis of a pseudo operating line connecting the SLTO and cruise design points as shown in figure 16. Referring to the points

labeled A and B on the typical constant rotor speed line in the figure, the stall margin is defined as

$$\frac{\left(\frac{P_R}{W\sqrt{\theta/\delta}}\right)_B - \left(\frac{P_R}{W\sqrt{\theta/\delta}}\right)_A}{\left(\frac{P_R}{W\sqrt{\theta/\delta}}\right)_A} \times 100$$

where  $P_R$  is the stage pressure ratio and subscripts A and B refer to the intersection of the speed line with the operating line and stall line, respectively. Discussion of the significance of this stall margin definition is presented in Appendix C.

The 100 and 70% rotor speed lines of the SLTO and cruise configurations operating with radial and circumferential distortion were evaluated in this manner. The results are presented in table 2. In general, for undistorted flow, the SLTO configuration had slightly greater stall margin than the cruise configuration at 100% of design equivalent rotor speed (SLTO conditions); and the cruise configuration had slightly greater stall margin than the SLTO configuration at 70% of design rotor speed (cruise) conditions. At cruise conditions (70% speed) the cruise configuration stall margin with radial distortion was 16.5% greater than that of the SLTO configuration. With circumferential distortion the stall margin of the cruise configuration at cruise operating conditions was approximately 19% greater than that of the SLTO configuration. These comparisons reflect the apparent compensation of the cruise configuration rotor prewhirl for the reduced axial velocities (in the distorted flow region) which tend to maintain tolerable rotor incidence conditions. A tabulation of basic data obtained from the distortion tests is presented in tables B-1 and B-2 of Appendix B. The undistorted results are given in reference 3.

Table 2. Evaluation of Stall Margin

Configuration	SLTO		Cruise	
Percent Design Equivalent Rotor Speed	100	70	100	70
Stall Margin: Undistorted,%	48	37	40	39
Stall Margin: Radial Distortion,%	34	24	31	28
Stall Margin: Circumferential Distortion,%	29	32	29	38

References

1. "Single Stage Experimental Evaluation of Variable Geometry Guide Vanes and Stators, Part I - Analysis and Design," NASA CR-54554, PWA FR-2112.
2. "Single Stage Experimental Evaluation of Variable Geometry Guide Vanes and Stator Blading, Part III - Data and Performance for Variable Camber Guide Vanes and Stator A," NASA CR-54556, PWA FR-2638.
3. "Single Stage Experimental Evaluation of Variable Geometry Guide Vanes and Stators, Part IV - Data and Performance for Variable Camber Guide Vanes and Stator B," NASA CR-54557, PWA FR-2639.
4. "Variation with Mach number of Static and Total Pressure through Various Screens," NACA CB No. L5F28.

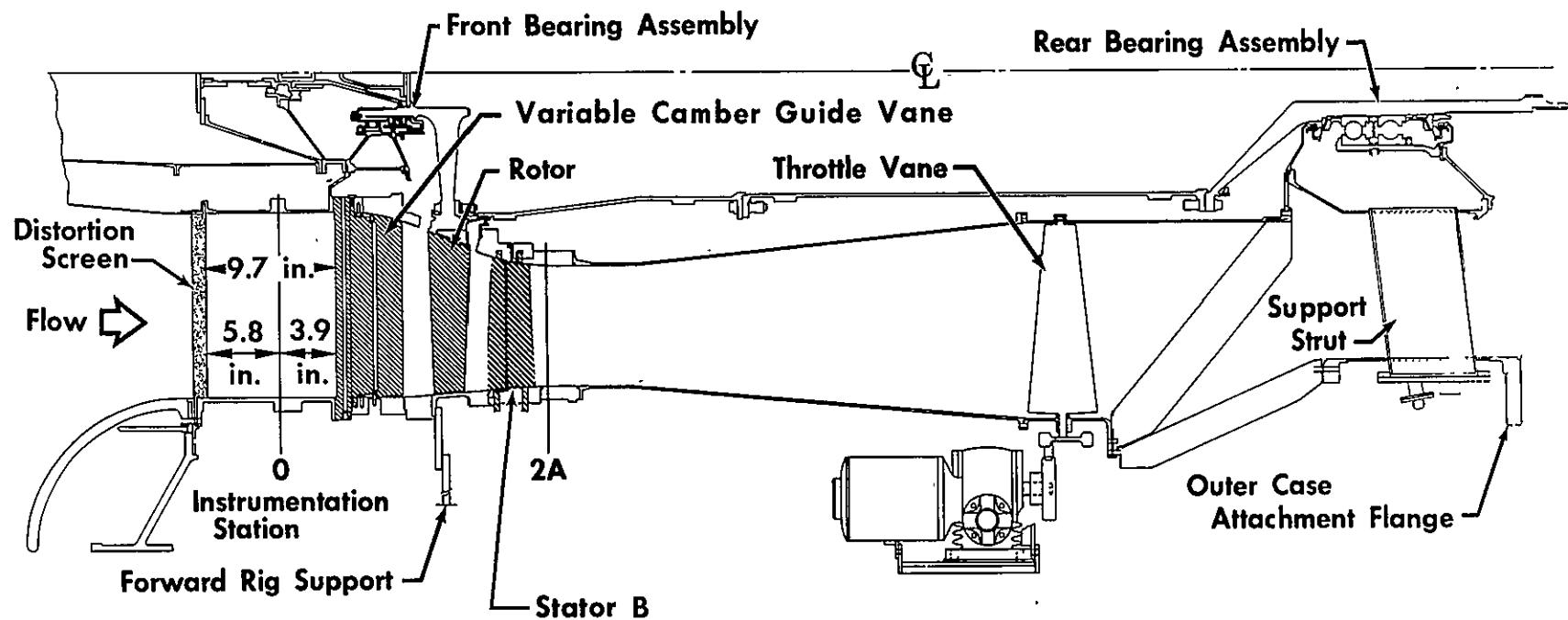


Figure 1. Compressor Rig Showing Axial Location of Distortion Screen and Instrumentation Stations GS 2120G

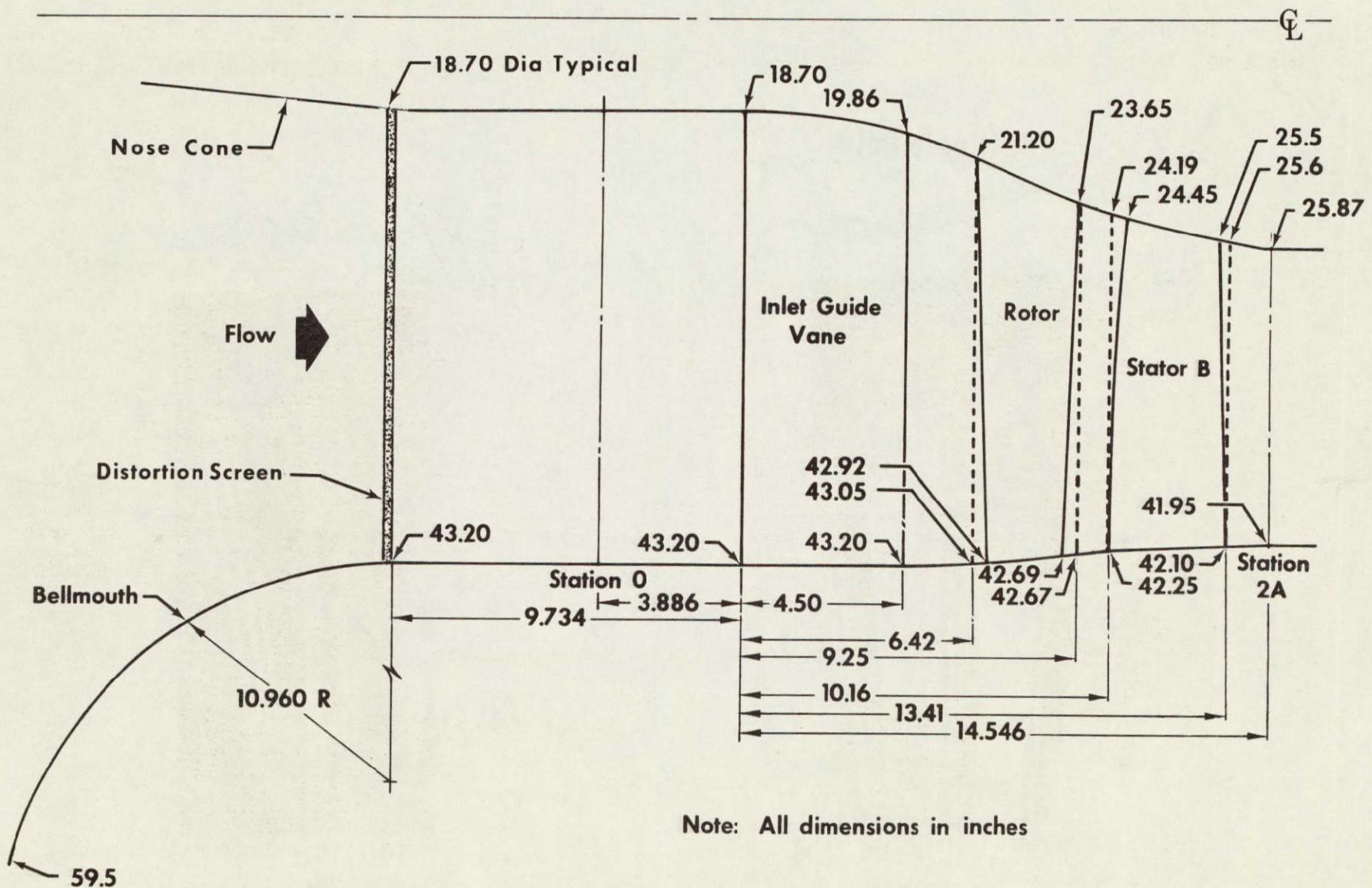


Figure 2. Section View of Flowpath

GS 6614C

**Variable-Camber  
Inlet Guide Vane  
(Cruise Position)**



**Stator B  
(Cruise Position)**

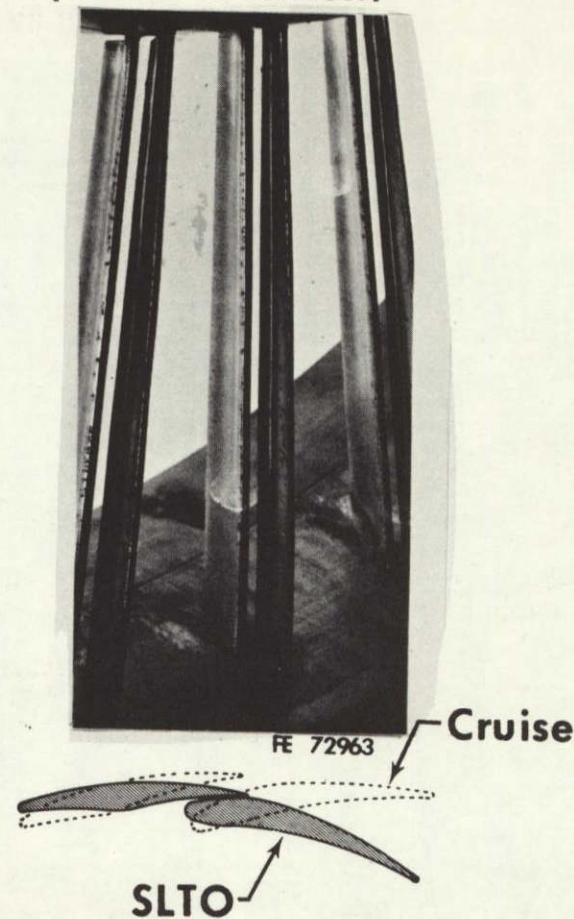


Figure 3. Variable-Geometry Inlet Guide Vane and Stator B

GS 6613C

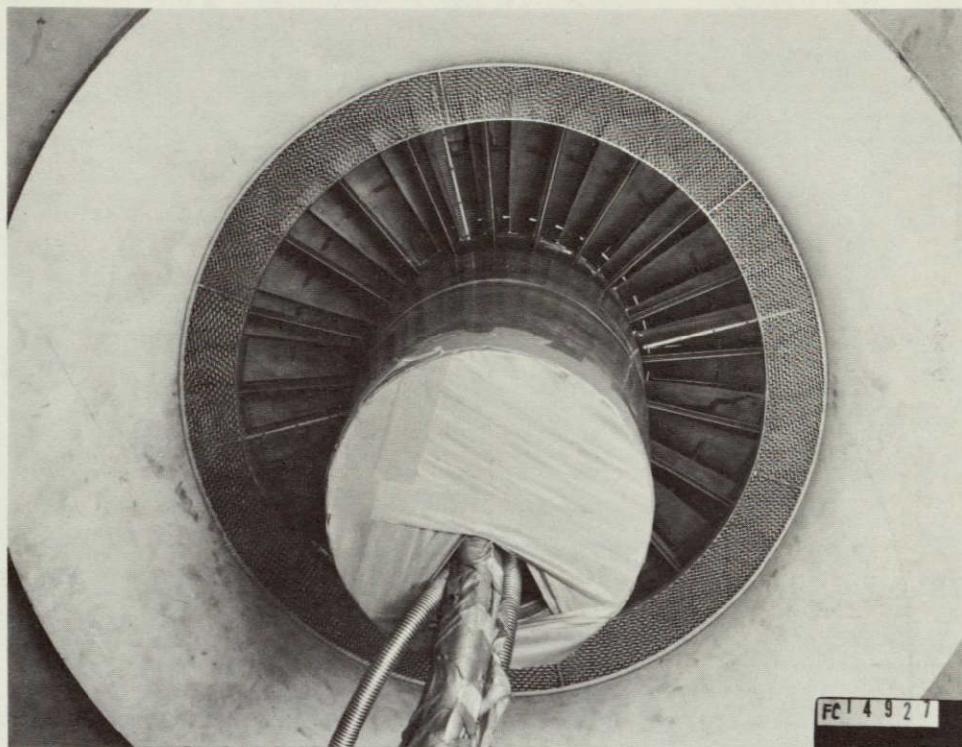


Figure 4. 360-Deg Radial Distortion Screen

FC 14927

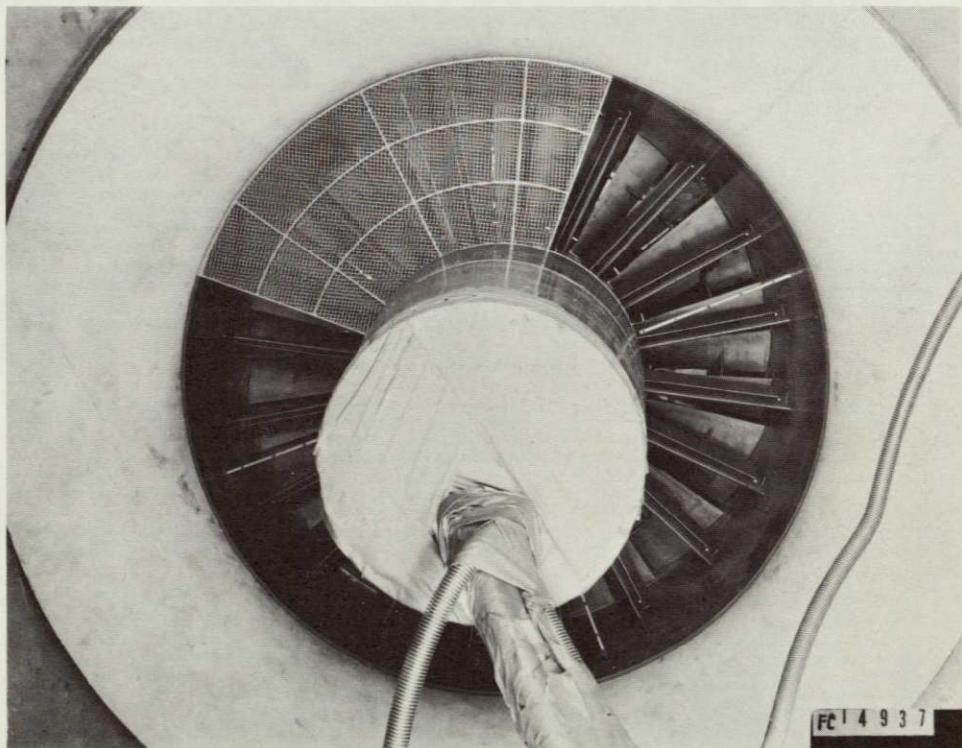


Figure 5. 90-Deg Circumferential Distortion Screen

FC 14937

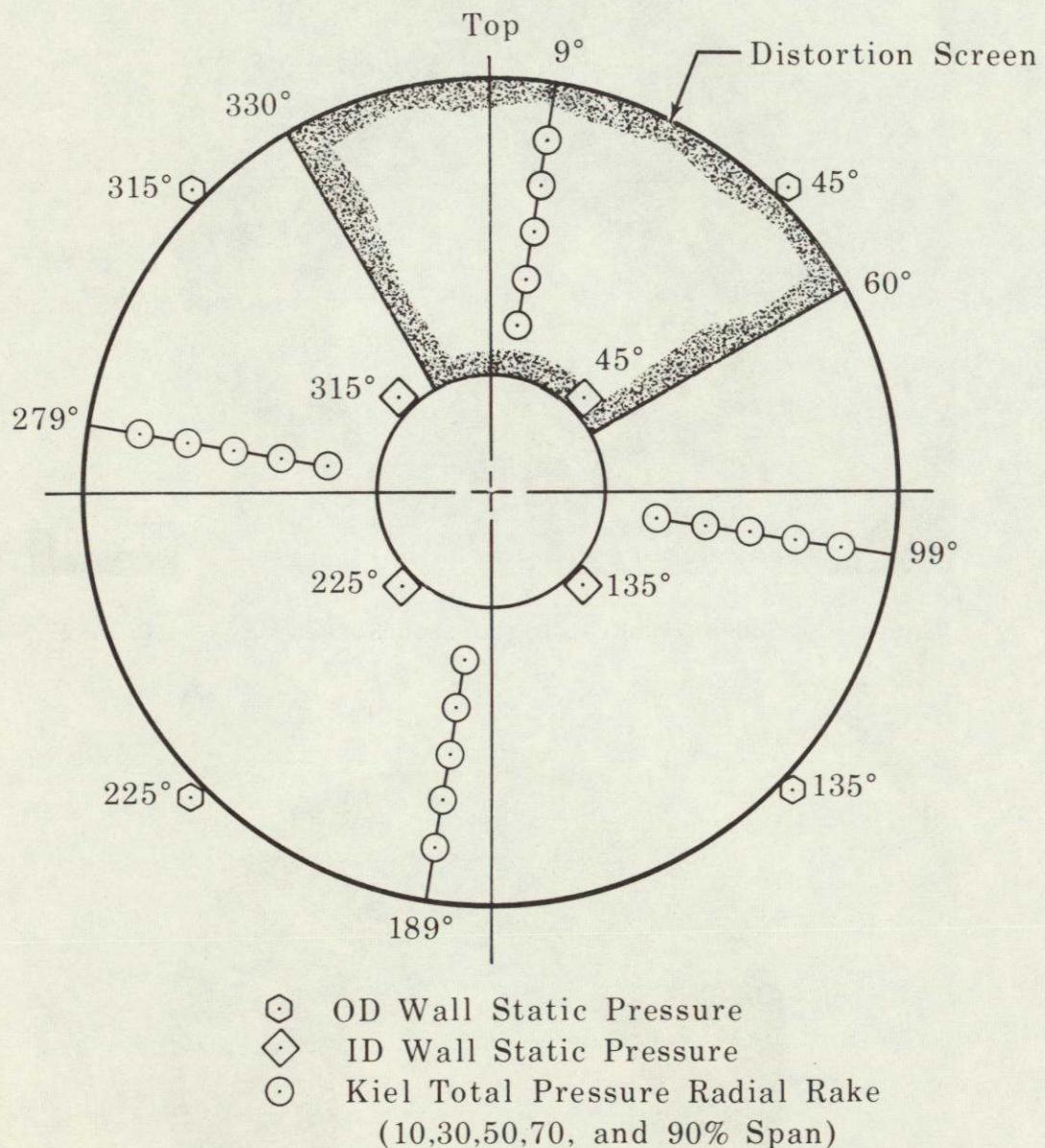


Figure 6. Instrumentation Station 0, View Looking Upstream

FD 27412

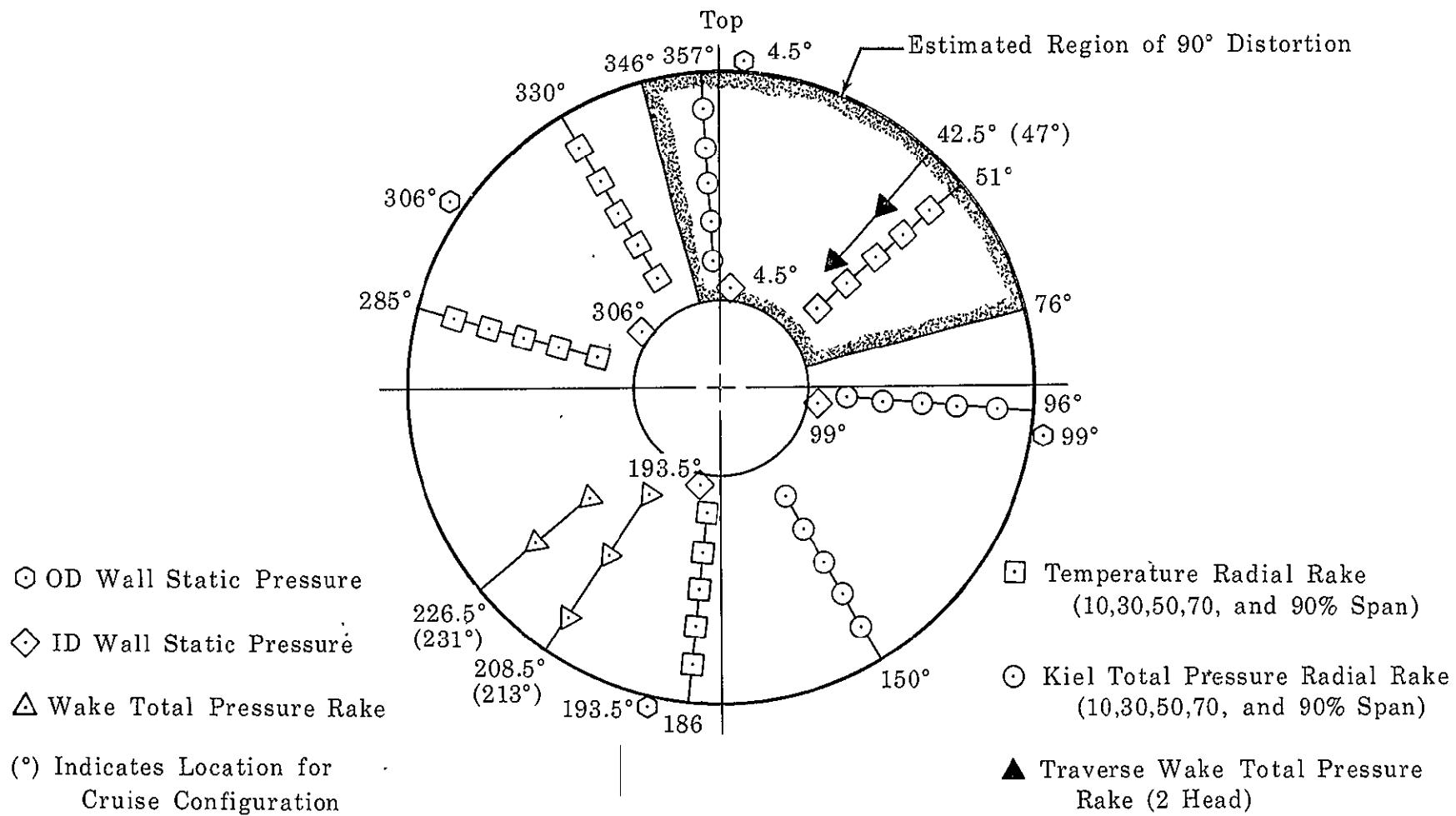


Figure 7. Instrumentation Station 2A, View Looking Upstream

FD 27413

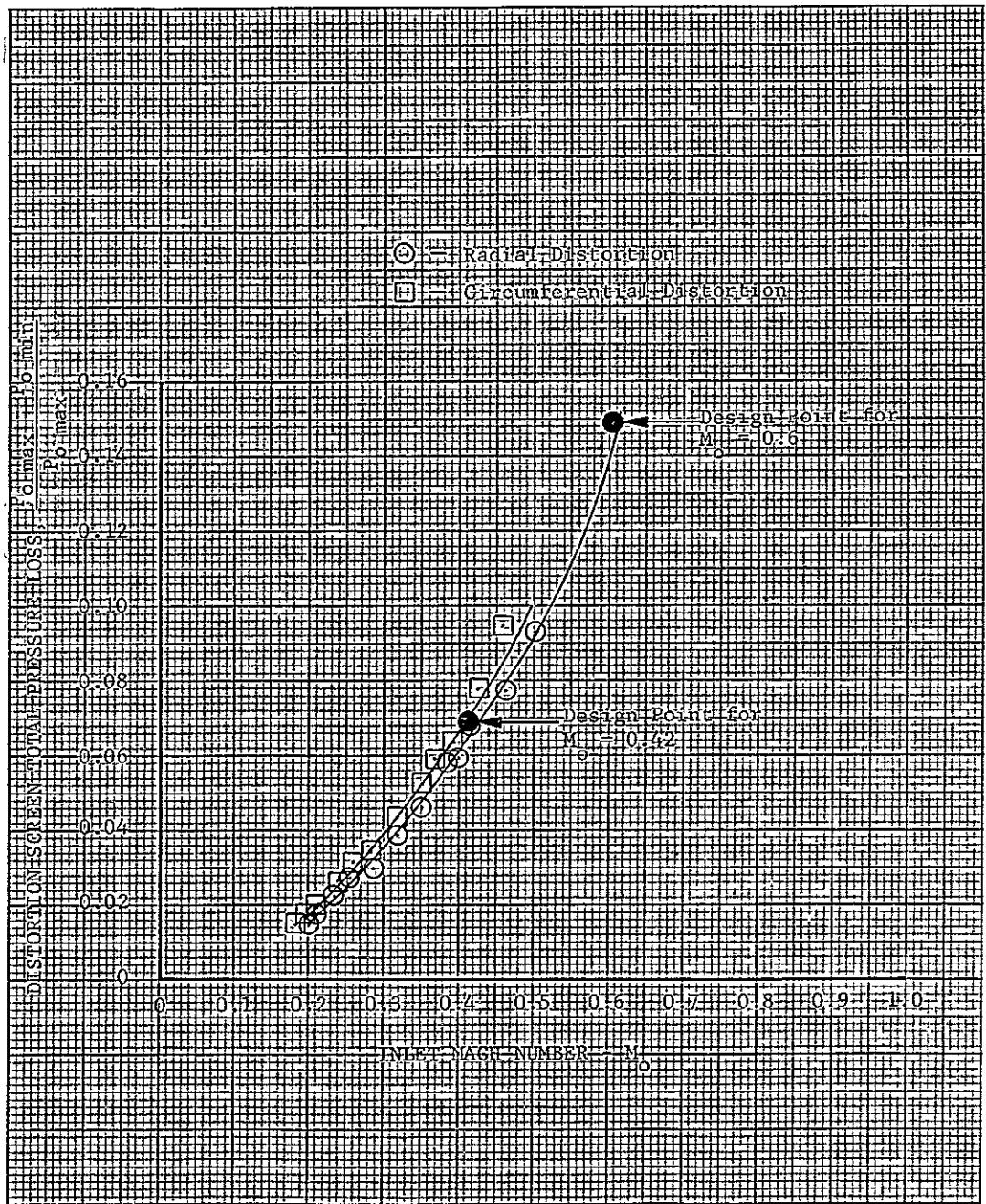


Figure 8. Distortion Screen - Total Pressure Loss

DF 69708

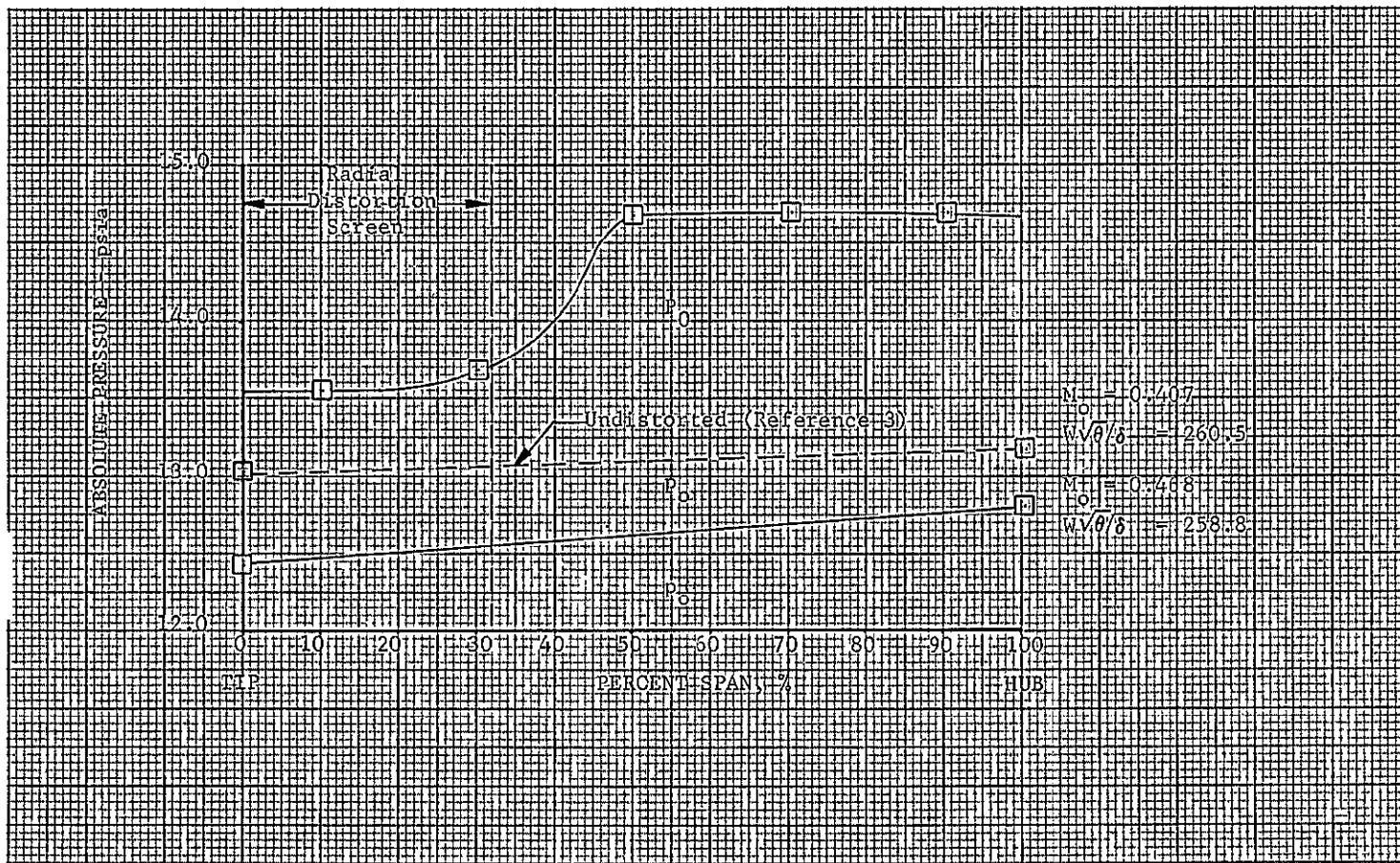


Figure 9. Radial Distribution of Total and Static Pressure at Station 0, Sea Level Takeoff Configuration, 100% Equivalent Rotor Speed, Near Design Flow

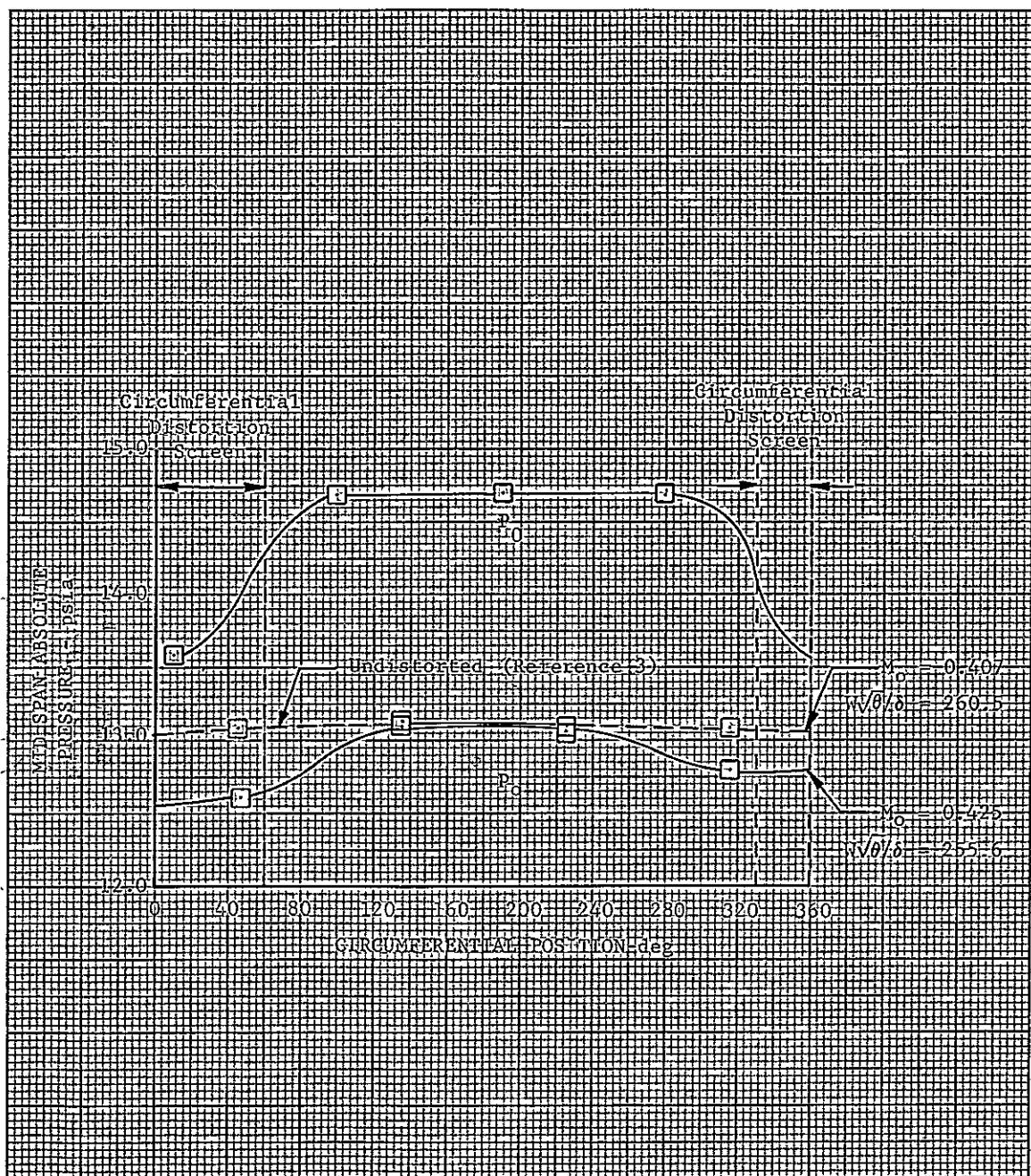


Figure 10. Circumferential Distribution of Total and Static Pressure at Station 0, Sea Level Takeoff Configuration, 100% Equivalent Rotor Speed, Near Design Flow

DF 69716

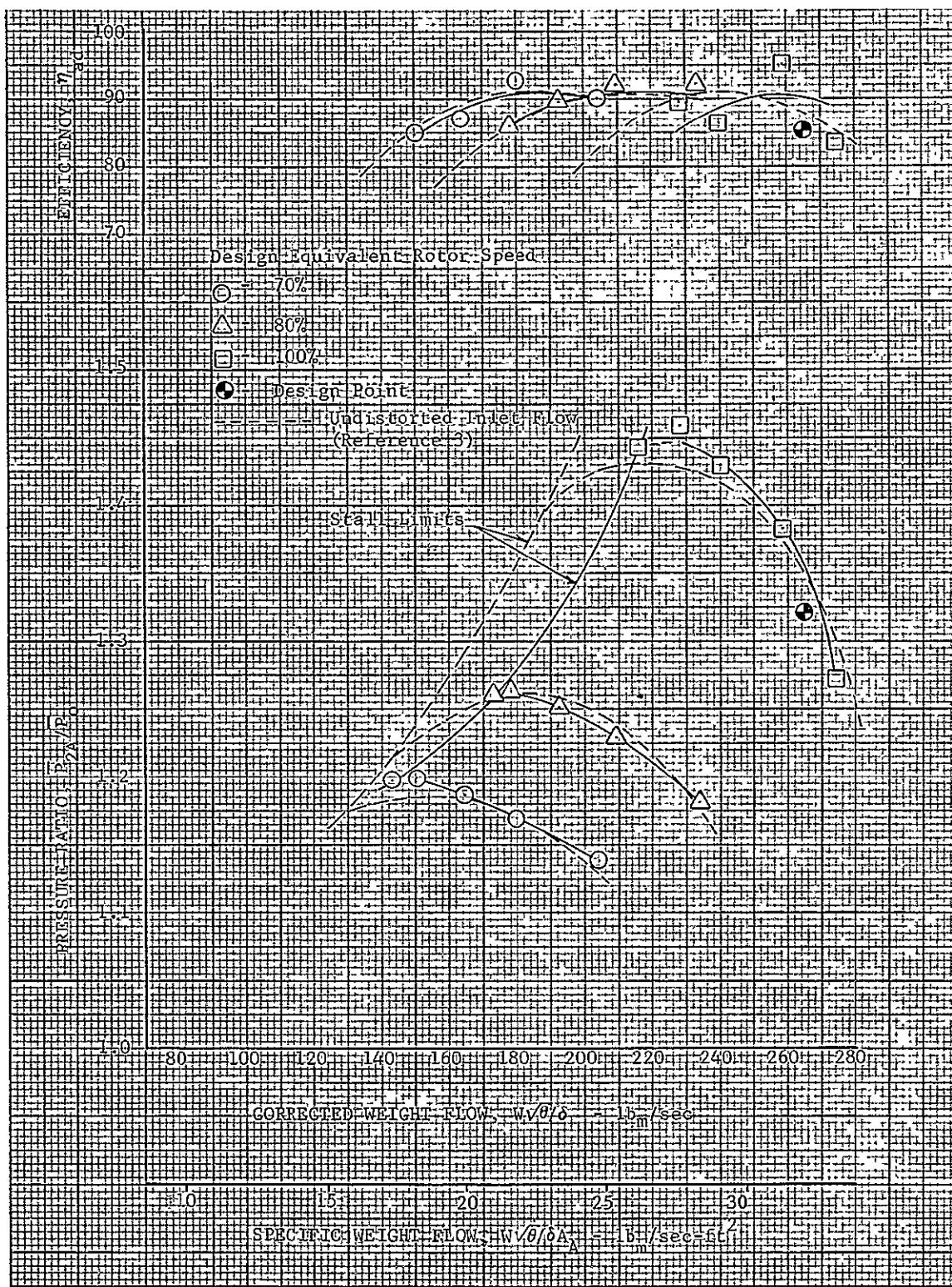


Figure 11. Overall Performance With 360-Deg Radial Distortion - SLTO Configuration

DF 69710

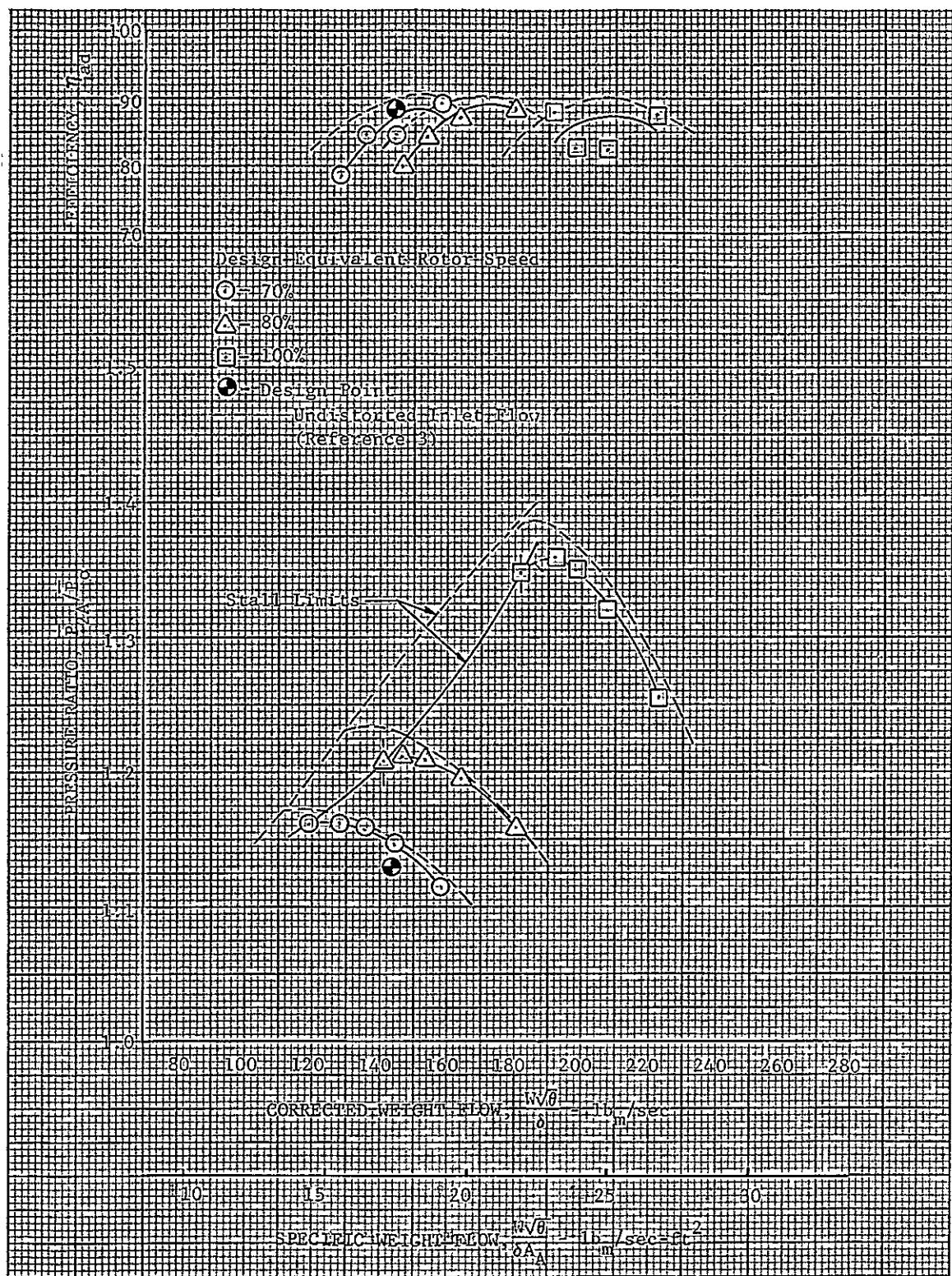


Figure 12. Overall Performance With 360-Deg Radial Distortion - Cruise Configuration

DF 69711

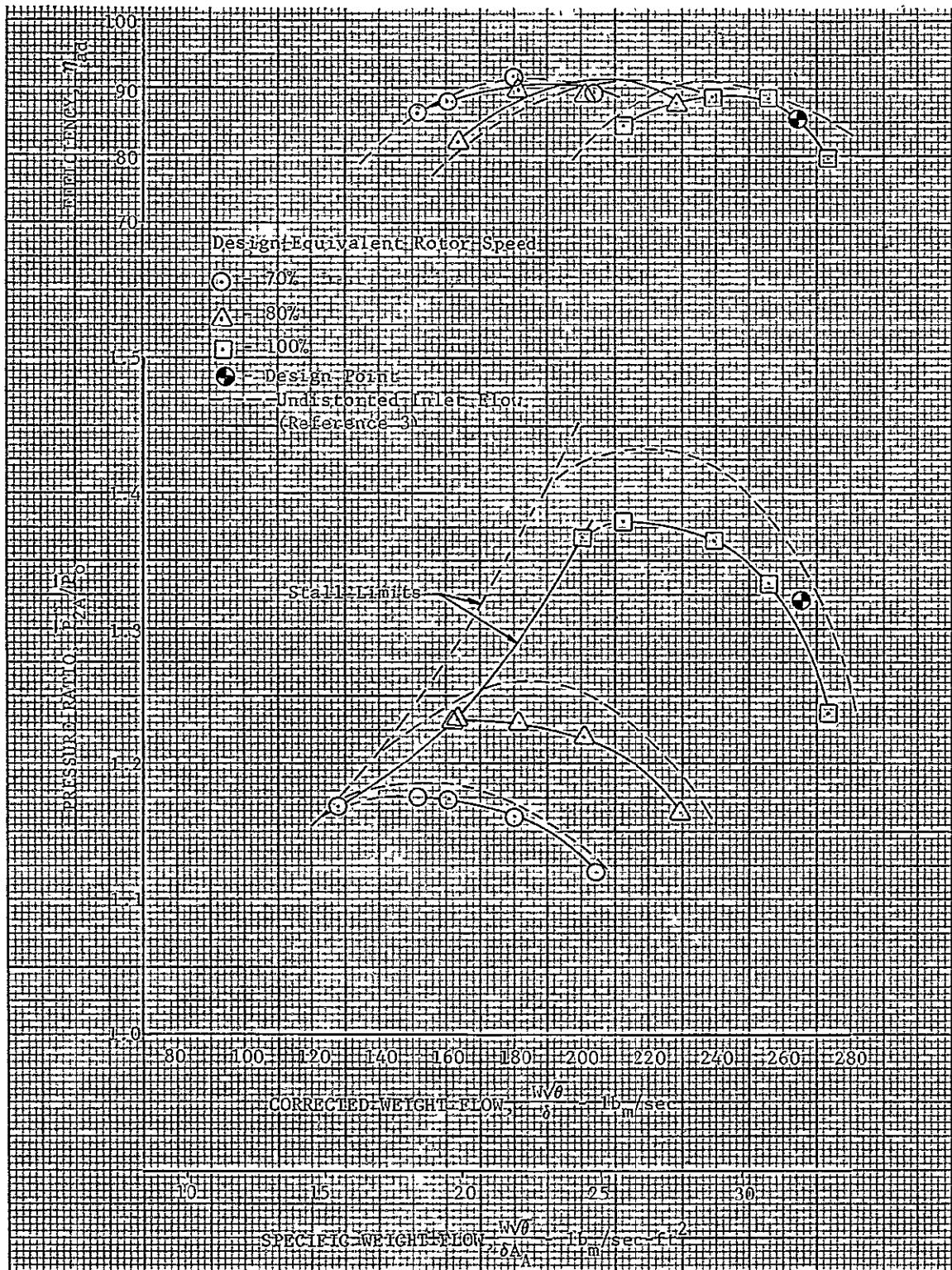


Figure 13. Overall Performance With 90-Deg Circumferential Distortion - SLTO Configuration

DF 69712



Figure 14. Overall Performance With 90-Deg Circumferential Distortion - Cruise Configuration

DF 69713

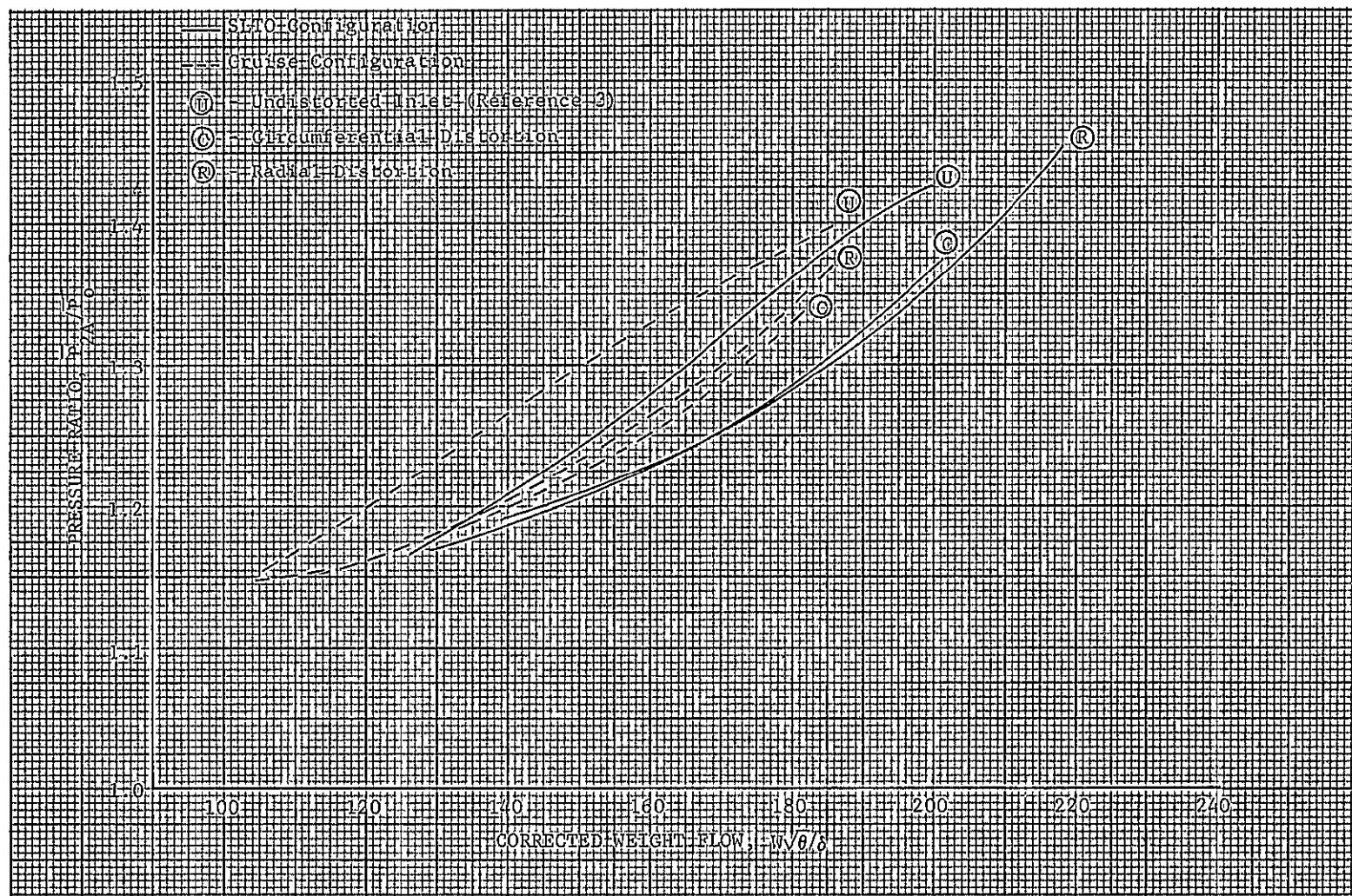


Figure 15. Stall Limit Comparisons

DF 69714

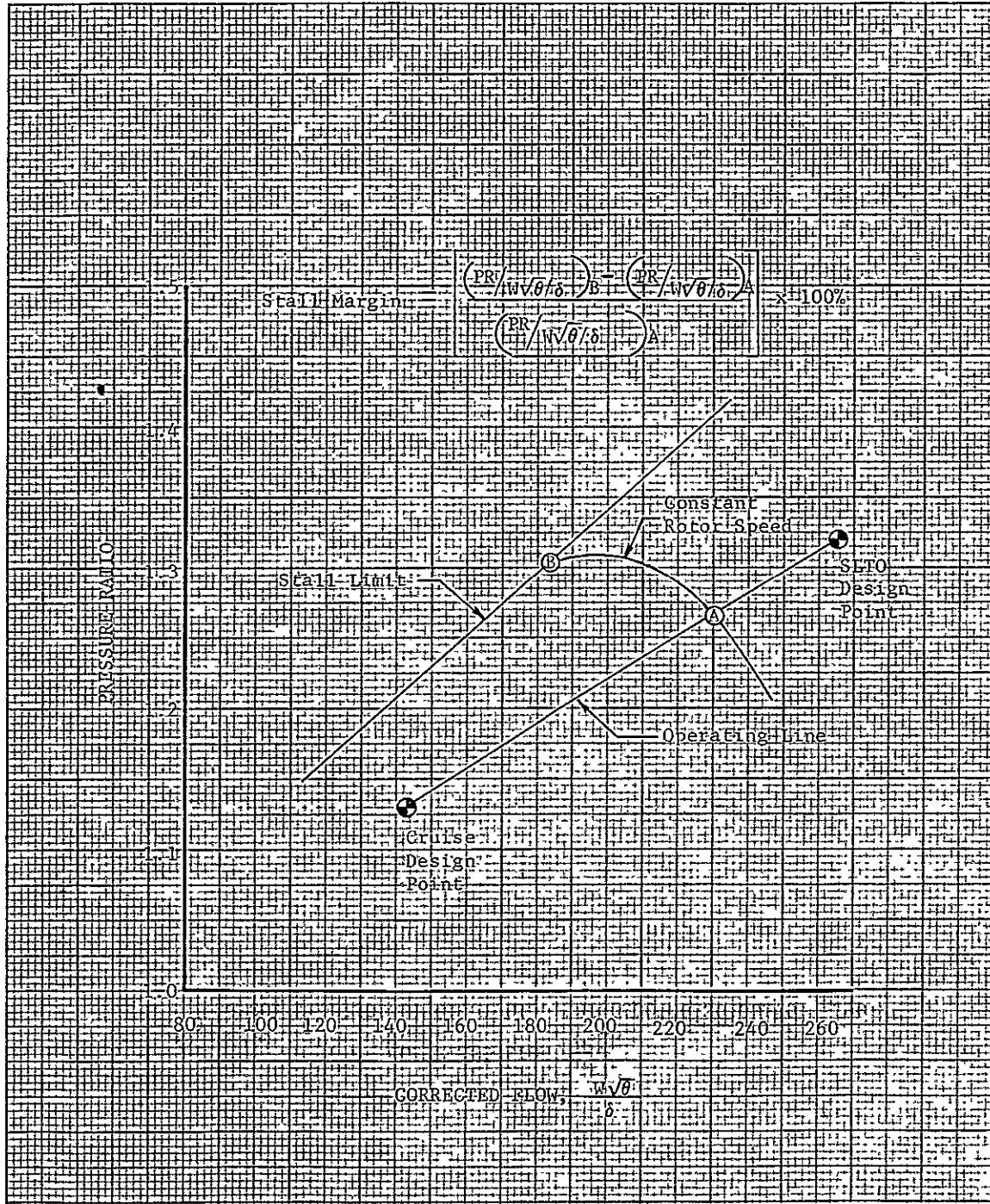


Figure 16. Operating Line For Evaluation of Stall Margin

APPENDIX A  
DEFINITION OF SYMBOLS' AND PERFORMANCE VARIABLES

Definition of Symbols

$A_A$	Flow path annular area, ft <sup>2</sup>
$c$	Chord length, in.
$i_m$	Incidence Angle, deg (based on equivalent circular arc meanline for stators)
$M$	Mach number
$P$	Total pressure, psia
$P_R$	Stage total pressure ratio
$p$	Static pressure, psia
$S$	Blade spacing, in.
SLTO	Sea level takeoff
$T$	Total temperature, °R
$t$	Blade maximum thickness, in.
$W$	Actual flow rate, lb <sub>m</sub> /sec
$\gamma^\circ$	Blade chord angle, deg
$\delta$	Ratio of total pressure to NASA standard sea level pressure of 2116 psf
$\delta^\circ$	Deviation angle, deg
$\eta_{ad}$	Adiabatic efficiency
$\theta$	Ratio of total temperature to NASA standard sea level temperature of 518.7°R
$\kappa$	Blade metal angle, deg (based on equivalent circular arc meanline for stator vanes)
$\sigma$	Solidity, c/S
$\phi$	Blade camber angle, deg (based on equivalent circular arc meanline for stator vanes).

Subscripts

0	Compressor inlet instrumentation station
2A	Stator exit instrumentation station
A	Point on operating line
B	Point on stall line

Superscripts

-	Mass average value
---	--------------------

## DEFINITION OF PERFORMANCE VARIABLES

Stage Pressure Ratio:

$$\frac{\bar{P}_{2A}}{\bar{P}_o}$$

Corrected Flow:

$$w \sqrt{\theta} / \delta$$

Corrected Specific Flow:

$$\frac{w\sqrt{\theta}}{\delta A_A}$$

Corrected Rotor Speed:

$$N/\sqrt{\theta}$$

tic Efficiency:

$$\frac{(\bar{P}_{2A}/\bar{P}_o)^{\frac{\gamma-1}{\gamma}} - 1}{\bar{T}_{2A/518.7} - 1}$$

## APPENDIX B BASIC DISTORTION DATA

This appendix presents basic distortion data in tabular form. The following data are presented:

1. Wall static pressures for Instrumentation Stations 0, 1, 2, and 2A (See figure 1.)
2. Total pressure at 10, 30, 50, 70, and 90% span from tip for Instrumentation Stations 0 and 2A
3. Total temperature at 10, 30, 50, 70, and 90% span from tip for Instrumentation Station 2A.

Data for the test with 360-degree radial distortion are presented in table B-1. Data for the test with 90-degree circumferential distortion are presented in table B-2. Each page of the tables represents one data point and is identified accordingly by  $\frac{W\sqrt{\theta}}{\delta}$ , data point number, and rotor speed. Data omissions in the tables indicate faulty data; these data were not used in the performance calculations.

The circumferential locations (circ. loc. deg.) refer to those shown in the instrumentation diagrams in figures 6 and 7 for Stations 0 and 2A. The circumferential locations for the Station 1 and 2 static pressure data are referenced to the 0-degree location indicated in these figures.

Table B-1. Basic Distortion Data 360-Degree Radial Distortion

$$\sqrt{\rho_s} = 149.774$$

$$\rho_{2A}/\rho_0 = 1.1985$$

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 222.

SLTO CONFIGURATION				70 % EQUIVALENT ROTOR				SPEED		
CIRC.	LOC.	STATION 0	WALL STATICS	CIRC.	LOC.	STATION 2		CIRC.	LOC.	STATION 2A
DEG.	TIP	HUB	LOC.	STATION 1	DEG.	TIP	HUB	DEG.	TIP	HUB
45	14.050	14.160	3	13.927	10	*	15.345	45	16.294	16.059
135	14.027	14.157	102	13.914	14.225	94.5	16.414	99	16.368	16.022
225	14.037	14.167	197.5	13.911		180	16.013	193.5	16.343	16.098
315	14.021	14.164	283.5	13.935	14.247	270	5.403	306	16.315	16.938

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

DISCHARGE TOTAL TEMPERATURE					
STATION 2A					
CIRC.	PERCENT SPAN FROM TIP				
LOC.					
DEG.	10	30	50	70	90
51	533.650	527.110	521.720	520.170	519.010
96	533.650	527.110	522.100	519.390	520.940
285	532.980	526.340	520.940	520.940	518.620
330			520.170		

## INLET TOTAL PRESSURE

STATION 0

INLET TOTAL PRESSURE					
STATION 0					
CIRC.	PERCENT SPAN FROM TIP				
LOC.					
DEG.	10	30	50	70	90
9	14.388	14.423	14.697	14.696	14.699
99	14.391	14.422	14.710	14.705	14.704
189	14.378	14.373	14.714	14.699	14.702
279	14.382	14.413	14.692	14.693	14.700

## DISCHARGE TOTAL PRESSURE

STATION 2A

DISCHARGE TOTAL PRESSURE					
STATION 2A					
CIRC.	PERCENT SPAN FROM TIP				
LOC.					
DEG.	10	30	50	70	90
203.5	17.694		17.161		16.867
226.5		17.396		16.959	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.051	16.306	16.281	16.353	16.021	16.187	16.413	15.362	16.064

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$\sqrt{\theta}/S = 163.707$$

$$\rho_{2A}/\rho_0 = 1.1862$$

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 223.

## SLTO CONFIGURATION

## 70 % EQUIVALENT ROTOR SPEED

CIRC.	STATION 0			STATION 1			STATION 2			STATION 2A		
	LOC.	DEG.	TIP	LOC.	DEG.	TIP	LOC.	DEG.	TIP	LOC.	DEG.	TIP
45	13.918	14.057		3	13.767		10	*	15.132	45	16.036	15.785
135	13.904	14.030		132	13.732	14.133	94.5	16.194	15.132	99	16.108	15.776
225	13.710	14.075		137.5	13.730		190	15.853	15.165	193.5	16.090	15.549
315	13.622	14.054		290.5	13.774	14.142	270		15.212	306	16.032	

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	LOC.	DEG.	10	30	50	70	90
51	552.130	547.900	543.060	541.940	541.940		
135	557.740	542.300	543.460	541.440	542.250		
225	552.330	547.100	543.970	541.030	542.250		
315					541.030		

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC.	LOC.	DEG.	10	30	50	70	90
9	14.295	14.353	14.670	14.686	14.694		
99	14.902	14.347	14.692	14.589	14.704		
135	14.304	14.320	14.702	14.599	14.683		
270	14.312	14.364	14.688	14.691	14.693		

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	LOC.	DEG.	10	30	50	70	90
203.5		17.430			17.079		16.705
225.5			17.268			16.990	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.044	16.067	16.198	16.121	15.894	16.036	16.210	16.092	15.858

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$W\sqrt{S} = 180.080$

$P_{\infty}/P_0 = 1.1683$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 224.

SLTO CONFIGURATION

70% EQUIVALENT ROT.

SPEED

CIRC. LOC. DEG.	STATION 3		CIRC. LOC. DEG.		STATION 1		CIRC. LOC. DEG.		STATION 2		CIRC. LOC. DEG.		STATION 2A	
	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB
45	13.719	13.876	3	13.564			10	*	14.806		45	15.596	15.314	
135	13.698	13.822	102	13.535	14.003		94.5	15.846	14.781		99	15.642	15.366	
225	13.711	13.893	187.5	13.529			180	15.573	14.856		193.5	15.698	15.385	
315	13.709	13.876	286.5	13.529	14.015		270		14.932		306	15.529		

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	548.980	548.283	548.030	539.210	539.210
136	550.130	545.300	541.200	539.210	539.210
283	546.510	544.390	542.440	539.620	539.210
320			539.620		

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.241	14.267	14.690	14.691	14.685
99	14.260	14.314	14.702	14.697	14.704
189	14.238	14.243	14.719	14.706	14.704
279	14.207	14.273	14.698	14.700	14.705

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
208.5	17.098		16.877		16.724
226.5		16.977		16.786	

* (DEGREES)	351	334	355.5	357	359	1.5	4	6	9
	15.531	15.685	15.066	15.762	15.562	15.671	15.800	15.770	15.549

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$\frac{W_0}{S} = 203.910$

$\frac{P_m}{P_0} = 1.1383$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 220.

SLTO CONFIGURATION

70 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION TIP HUB	ALL STATICS			CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB			
		CIRC. LOC. DEG.	STATION TIP HUB	STATION TIP HUB							
45	12.452	13.608	3	13.261	10	*	14.179	45	14.635	14.222	
135	13.460	13.633	102	13.277	13.701	94.5	15.038	14.097	99	14.620	14.388
225	13.437	13.635	187.5	12.274		120	14.976	14.205	193.5	14.551	14.270
315	13.443	13.630	286.5	13.251	13.712	270		14.335	306	14.473	

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	525.530	522.430	518.880	518.890	519.280
133	525.750	523.610	520.460	519.280	519.280
225	525.970	523.220	520.460	519.570	520.070
303	523.850	520.850	519.670		

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.001	14.103	14.660	14.886	14.701
99	14.067	14.116	14.695	14.697	14.702
189	14.036	14.051	14.703	14.704	14.683
279	14.063	14.145	14.679	14.681	14.687

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
208.5	16.396		16.395		16.423
226.5		16.337		16.394	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	14.014	14.859	15.046	14.993	14.874	14.880	14.959	14.957	14.785

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$W\bar{\theta}/S = 177.930$$

$$\rho_{in}/\rho_0 = 1.2643$$

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 227.

SLTO CONFIGURATION				80 % EQUIVALENT ROTOR SPEED										
CIRC. LOC. DEG.	STATION 0 TIP	HUB	CIRC. LOC. DEG.	STATION 1 TIP	HUB	WALL	STATICS	CIRC. LOC. DEG.	STATION 2 TIP	HUB	CIRC. LOC. DEG.	STATION 2A TIP	HUB	
45	13.718	13.945	3	13.582				10	*	15.529		45	17.563	16.455
135	13.723	13.935	102	13.206	14.019			94.5	16.933	15.535		99	16.897	16.407
225	13.728	13.939	187.5	13.556				180	16.444	15.526		193.5	16.853	16.512
315	13.710	13.918	226.5	13.593	14.042			270		15.599		306	16.835	

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	569.960	560.330	552.270	550.650	548.240
135	569.160	560.730	553.080	549.850	551.470
225	560.730	558.720	551.470	551.870	548.640
315			549.850		

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.253	14.271	14.662	14.680	14.692
99	14.242	14.272	14.634	14.686	14.692
189	14.236	14.228	14.695	14.688	14.684
279	14.210	14.265	14.676	14.672	14.682

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
208.5	18.589		17.965		17.656
226.5		18.299		17.811	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.449	16.797	17.006	16.912	16.441	16.712	17.001	16.934	16.473

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$W_{\infty}/S = 172.410$

$\rho_{\infty}/\rho_0 = 1.2504$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 228.

SLTO CONFIGURATION

80 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATIC 0		WALL STATIC		CIRC. LOC. DEG.		STATIC 2		CIRC. LOC. DEG.		STATION 2A	
	TIP	HUB	LOC. DEG.	STATION 1 TIP HUB	LOC. DEG.	STATION 2 TIP HUB	LOC. DEG.	STATION 2A TIP HUB	LOC. DEG.	STATION 2A TIP HUB	LOC. DEG.	STATION 2A TIP HUB
45	13.551	13.771		3 13.320		10 *	15.214		45	16.402	16.075	
135	13.524	13.764		102 13.324	13.912	94.5	16.586	15.239	99	16.507	16.056	
225	12.568	13.757		187.5 13.302		180	16.253	15.281	193.5	16.479	16.138	
315	13.526	13.761		286.5 13.318	13.922	270		15.336	306	16.388		

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	564.040	556.410	549.960	547.950	548.350
136	564.040	556.000	549.960	547.140	549.150
285	562.830	555.200	550.360	546.730	547.950
330		549.560	547.950		

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.138	14.211	14.677	14.684	14.691
99	14.152	14.236	14.685	14.691	14.694
189	14.137	14.142	14.690	14.577	14.681
279	14.116	14.156	14.654	14.652	14.677

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
208.5	18.411		17.764		17.327
226.5		18.098		17.618	

*	(DEGREES)	351	354	255.5	357	359	1.5	4	6	9
		16.164	16.455	16.753	16.548	16.230	16.323	16.620	16.614	16.245

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\sqrt{S} = 207.240$  $\rho_{in}/\rho_0 = 1.2295$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 229.

## SLTD CONFIGURATION

80 % EQUIVALENT ROTOR SPEED

CIRC.	LOC.	STATION 0 TIP	HUB	CIRC.	LOC.	STATION 1 TIP	HUB	CIRC.	LOC.	STATION 2 TIP	HUB	CIRC.	LOC.	STATION 2A TIP	HUB
DEG.				DEG.				DEG.				DEG.			
45	13.327	13.553		3	13.086			10	*	14.804		45	15.858	15.482	
135	13.313	13.547		102	13.100	13.719		94.5	16.195	14.795		99	15.929	15.569	
225	13.326	13.555		187.5	13.052			180	15.876	14.877		193.5	15.875	15.580	
315	13.320	13.548		286.5	13.093	13.742		270		14.987		306	15.799		

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
DEG.						
51	559.070	552.210	547.360	545.730	545.730	
156	552.250	553.420	549.170	545.730	545.730	
285	559.470	552.610	547.760	546.550	546.140	
330		549.170	546.140			

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
DEG.						
9	14.027	14.099	14.695	14.694	14.705	
99	14.067	14.115	14.695	14.702	14.702	
189	14.051	14.045	14.727	14.721	14.696	
279	14.006	14.083	14.679	14.685	14.704	

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
DEG.						
208.5	17.954			17.555		
226.5		17.720			17.479	17.359

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.832	16.007	16.320	16.113	15.751	15.894	16.082	16.145	15.791

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\bar{V}/S = 232.600$  $P_{2A}/P_0 = 1.1822$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 225.

## SLTO CONFIGURATION

80% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL		STATICS		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.		STATION 2A	
	TIP	HUB	CIRC. LOC. DEG.	TIP	HUB	CIRC. LOC. DEG.	TIP	HUB	TIP	HUB	TIP	HUB	
45	13.016	13.271	3	12.670		10	*	13.987	45	14.565	14.050		
135	12.995	13.284	102	12.690	13.352	94.5	15.144	13.949	99	14.534	14.285		
225	12.963	13.284	187.5	12.642		100	17.942	14.055	193.5	14.507	14.132		
315	12.948	13.268	289.5	12.546	13.384	270		14.230	306	14.393			

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	530.320	544.670	541.020	541.420	542.640
136	532.340	546.730	542.050	541.420	541.420
225	531.930	546.290	542.240	542.240	545.480
315		543.050	541.420		548.310

## INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.817	13.934	14.696	14.687	14.591
99	13.878	14.017	14.702	14.690	14.590
189	13.956	13.868	14.733	14.723	14.694
279	13.816	13.929	14.698	14.689	14.703

## DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
208.5	16.905		16.943		16.968
226.5		16.837		16.987	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	14.813	14.877	15.039	15.014	14.969	14.950	14.964	15.055	14.849

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\bar{\theta}/S = 227.660$  $P_{ea}/P_0 = 1.4593$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 232.

## SLTO CONFIGURATION

100% EQUIVALENT NUMBER SPAN

CIRC. LOC. DEG.	STATION 0		WALL STATIC		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB	LOC. DEG.	STATION 1	TIP	HUB	TIP	HUB	TIP	HUB
45	13.056	13.270	3	12.699			10	*	18.080	17.544
135	13.046	13.341	102	16.629	13.579		94.5	18.553	18.266	17.475
225	13.091	13.372	187.5	12.575			180	17.654	18.280	17.692
315	13.093	13.369	286.5	12.690	13.617		270	16.196	18.250	

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	600.790	584.470	569.580	566.760	561.940
185	599.250	582.750	569.580	566.760	561.940
285	600.020	582.750	570.390	569.580	561.940
330			564.350		

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.842	13.953	14.604	14.686	14.699
99	13.940	13.965	14.705	14.712	14.717
189	13.983	13.916	14.748	14.731	14.722
279	13.954	13.964	14.690	14.713	14.546

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
20°.5	21.512		19.955		19.145
226.5		20.633		19.507	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	17.637	18.255	18.651	18.450	17.640	18.020	18.472	18.448	17.628

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$W\bar{\theta}/\delta = 239.910$$

$$\rho_{ea}/\rho_0 = 1.4291$$

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 233.

CIRC.	SLTD CONFIGURATION			WALL	STATICS	100% EQUIVALENT ROTR SPEED			CIRC.	STATION 2A TIP	HUB	
	LOC.	STATION 0 TIP	HUB			LOC.	STATION 1 TIP	HUB				
DEG.				DEG.		DEG.			DEG.			
45	12.957	13.151		3	12.324				10	*	15.663	
135	12.915	13.139		102	12.352	13.379			94.5	18.119	15.794	45
225	12.844	13.140		197.5	12.289				180	17.420	15.714	99
315	12.941	13.131		286.5	12.383	13.422			270		15.827	193.5
												306
												17.829

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	DEG.					
51	594.220	578.980	567.590	563.970	562.770	
135	594.610	579.400	568.790	563.570	566.380	
225	595.390	579.400	569.200	565.980	563.570	
315			565.590			

## INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	DEG.					
9	13.714	13.890	14.662	14.690	14.694	
99	13.937	13.832	14.693	14.712	14.704	
199	13.763	13.775	14.738	14.714	14.705	
279	13.755	13.891	14.686	14.695	14.703	

## DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	DEG.					
208.5	23.948		19.862		18.978	
226.5		20.383		19.495		

\* (DEGREES) 351

354

355.5

357

359

1.5

4

6

9

17.149

17.717

18.275

17.978

17.136

17.540

18.015

17.992

17.292

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$W\sqrt{S} = 258.820$

$P_{2A}/P_0 = 1.3830$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 234.

SLTO CONFIGURATION

WALL STATICS

100% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION TIP 409	CIRC. LOC. DEG.	STATION TIP 1	HUB	CIRC. LOC. DEG.	STATION TIP 2	HUB	CIRC. LOC. DEG.	STATION TIP 2A	HUB
45	12.462	12.816	3	11.954	10	*	14.837	45	16.716	16.032
135	12.453	12.786	102	11.989	12.998	94.5	17.165	99	16.807	16.156
225	12.413	12.812	187.5	11.893	180	16.517	14.947	193.5	16.797	16.224
315	12.403	12.790	285.5	11.998	13.046	270	15.061	306	16.670	

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	587.410	574.590	564.500	561.290	559.670
185	561.290	588.570	576.630	566.510	560.880
285	574.590	587.800	574.590	565.710	562.490
330		564.910	564.910	560.880	

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.562	13.683	14.634	14.696	14.679
99	13.597	13.713	14.706	14.714	14.720
189	13.549	13.553	14.740	14.727	14.700
279	13.537	13.679	14.676	14.701	14.711

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
208.5	20.017		19.434		18.881
226.5		19.521		19.103	

* (DEGREES) 351	354	355.5	357	359	1.5	4	6	9
16.328	16.804	17.194	16.925	16.517	16.573	16.996	16.980	16.479

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$W\sqrt{S/C} = 273.620$$

$$\rho_{\infty}/\rho_0 = 1.2729$$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 230.

SLTO CONFIGURATION

ALL STATICS

100 % EQUIVALENT ROTOR SPEED

CIRC.	LOC.	STATION 0 TIP	STATION 0 HUB	CIRC.	LOC.	STATION 1 TIP	STATION 1 HUB	CIRC.	LOC.	STATION 2 TIP	STATION 2 HUB	CIRC.	LOC.	STATION 2A TIP	STATION 2A HUB
DEG.				DEG.				DEG.				DEG.			
45	12.081	12.553		3	11.611			10	*	13.610		45	14.466	13.613	
135	12.073	12.527		102	11.708	12.628		94.5	15.186	13.584		99	14.478	13.955	
225	12.030	12.514		187.5	11.579			120	14.865	13.566		193.5	14.397	13.807	
315	12.073	12.528		286.5	11.700	12.713		270		13.959		306	14.254	16.312	

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
DEG.						
51	570.930	560.050	553.990	554.800	556.010	
186	574.170	564.480	558.030	555.610	555.200	
285	570.930	561.670	556.010	556.420	557.220	
330		558.440	555.200			

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
DEG.						
9	13.328	13.560	14.650	14.677	14.687	
99	13.431	13.516	14.724	14.735	14.710	
189	13.397	13.393	14.761	14.735	14.714	
279	13.306	13.483	14.663	14.693	14.721	

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
DEG.						
208.5		17.970		17.941		18.218
226.5			17.361		18.183	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	14.737	14.848	15.252	15.157	14.940	14.690	15.054	14.971	14.683

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$W\bar{e}/S = 127.948$$

$$\rho_{2A}/\rho_0 = 1.1622$$

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 247.

## CRUISE CONFIGURATION

## WALL STATICS

## 70 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB
45	14.249	14.298	3	14.125	10	*	14.833
135	14.241	14.293	102	14.112	14.201	94.5	16.014
225	14.229	14.297	187.5	14.114	180	15.724	14.880
315	14.241	14.298	286.5	14.105	14.220	270	15.899
							14.861

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	552.930	549.150	541.360	538.950	538.550
186	553.230	549.350	542.560	539.360	537.750
289	552.540	549.150	542.760	540.560	540.160
330		543.760	539.360		

## INLET TOTAL PRESSURE

## STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.474	14.506	14.687	14.694	14.689
99	14.476	14.531	14.689	14.691	14.522
139	14.474	14.472	14.699	14.699	14.689
279	14.463	14.500	14.685	14.690	14.692

## DISCHARGE TOTAL PRESSURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	17.260		16.543		16.137
231.0		17.036		16.539	

# (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.706	15.939	16.126	15.844	15.582	15.816	15.987	15.858	15.758

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$W_{\infty}/S = 134.688$

$\rho_{\infty}/\rho_0 = 1.1568$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 248.

CRUISE CONFIGURATION

ALL STATION

70% EQUIVALENT ROT. VELOC.

CIRC.	LOC.	STATION 0	CIRC.	LOC.	STATION 1	CIRC.	LOC.	STATION 2	CIRC.	LOC.	STATION 2A
DEG.	TIP	HUB									
45	14.188	14.248	3	14.040		10	*	14.719	45	15.645	15.416
135	14.198	14.243	102	14.028	14.166	94.5	15.920	14.771	99	15.752	15.419
225	14.170	14.238	187.5	14.029		180	15.624	14.735	193.5	15.662	15.431
315	14.183	14.245	236.5	14.024	14.186	270	15.734	14.744	306	15.731	15.493

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	51	549.310	545.320	543.520	532.120	527.720
	186	549.310	542.720	539.730	537.320	537.720
	265	549.710	545.320	542.120	538.530	538.120
	336		542.120	537.320		

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	9	14.446	14.483	14.533	14.697	14.695
	99	14.457	14.513	14.696	14.699	14.698
	189	14.451	14.452	14.699	14.700	14.698
	279	14.437	14.469	14.689	14.692	14.692

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	213.0	17.203		16.530		16.193
	231.0		16.960		16.455	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.600	15.801	16.051	15.746	15.512	15.848	15.842	15.783	15.667

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$W\sqrt{S} = 143.535$

$\bar{\rho}_w/\rho_0 = 1.1467$

360 DEGREE RADIAL DISTORTION						POINT NUMBER 249												
CIRC.	CIRCUIT: CONFIGURATION		WALL STATICS		CIRC.	70% EQUIVALENT ROTOR SPEED		CIRC.	STATION 2A									
	LOC.	STATION 0 TIP HUB	CIRC.	STATION 1 TIP HUB		LOC.	STATION 2 TIP HUB		LOC.	STATION 2A TIP HUB								
DEG.			DEG.			DEG.			DEG.									
45	14.118	14.214	3	13.934		10	*	14.538	45	15.375	15.054							
135	14.129	14.211	102	15.065	14.074	94.5	15.715	14.631	99	15.439	15.052							
225	14.117	14.204	157.5	13.973		180	15.469	14.559	193.5	15.373	15.066							
315	14.129	14.204	206.0	13.950	14.094	270	15.530	14.564	306	15.426	15.135							
DISCHARGE TOTAL TEMPERATURE																		
STATION 2A																		
CIRC.		PERCENT SPAN FROM TIP																
LOC.		%																
DEG.		10		30		50		70		90								
51		546.120		542.920		538.910		536.080		536.490								
185		548.510		544.920		538.910		536.080		536.890								
285		547.710		544.120		541.720		538.500		538.100								
330		541.320		537.700														
INLET TOTAL PRESSURE																		
STATION 0																		
CIRC.		PERCENT SPAN FROM TIP																
LOC.		%		10		30		50		70								
9		14.353		14.431		14.691		14.679		14.688								
99		14.437		14.501		14.688		14.703		14.704								
189		14.443		14.433		14.714		14.707		14.700								
279		14.408		14.451		14.696		14.596		14.703								
DISCHARGE TOTAL PRESSURE																		
STATION 2A																		
CIRC.		PERCENT SPAN FROM TIP																
LOC.		%		10		30		50		70								
213.0		17.072		16.735		16.409		16.303		16.097								
*																		
* (DEGREES)		351		354		355.5		357		359								
										1.5								
				15.596		15.899		15.558		15.360								
								15.519		15.681								
								15.599		15.503								
								6		9								

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$W\sqrt{\theta}/S = 157.557$

$P_{RA}/P_0 = 1.1152$

360 DEGREE RADIAL DISTORTION

POINT NUMBER 245.

CRUISE CONFIGURATION

70% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL		STATICS		CIRC. LOC. DEG.	STATION 1		STATION 2		CIRC. LOC. DEG.	STATION 2A			
	TIP	HUB	LOC.	DEG.	TIP	HUB		LOC.	DEG.	TIP	HUB	TIP	HUB			
45	13.982	14.084			3	13.774				10	*	14.116		45	14.874	14.164
135	14.004	14.094			102	13.786	13.928			94.5	15.224	14.230		99	14.696	14.153
225	13.987	14.088			187.5	13.806				180	15.073	14.157		193.5	14.627	14.240
315	13.986	14.082			286.5	13.751	13.942			270	15.039	14.202		306	14.698	14.344

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	541.820	537.790	534.560	531.720	532.130
185	541.020	539.810	534.160	531.320	532.530
285	542.620	539.410	536.180	533.350	532.530
330	536.580	536.580	532.530		

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.291	14.384	14.573	14.682	14.688
99	14.386	14.404	14.684	14.692	14.688
129	14.346	14.362	14.697	14.692	14.681
279	14.336	14.373	14.679	14.687	14.691

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	16.552		16.014		15.694
231.0		16.244		15.913	

* (DEGREES)	351	354	255.5	257	359	1.5	4	6	9
	14.937	15.049	15.262	15.099	14.982	15.051	15.179	15.144	15.114

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\sqrt{S} = 145.928$  $P_{20}/P_0 = 1.2120$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 242.

## CRUISE CONFIGURATION

80% EQUIVALENT NUMBER

## WALL STATICS

CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB
45	14.101	14.178	3	13.940	10	*	14.883
135	14.081	14.176	102	13.918	14.054	94.5	16.454
225	14.072	14.157	187.5	13.917	180	16.040	14.962
315	14.076	14.170	286.5	13.921	270	16.273	14.948

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	562.240	555.080	547.500	543.500	543.500
186	562.640	557.070	548.290	544.300	541.890
285	563.040	555.080	548.290	544.300	544.300
330			544.300		

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.364	14.428	14.686	14.680	14.681
99	14.415	14.450	14.687	14.687	14.696
129	14.406	14.410	14.702	14.686	14.689
279	14.387	14.423	14.684	14.689	14.682

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	18.056		17.239		16.506
231.0		17.788		17.104	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.009	16.326	16.673	16.239	15.864	16.151	16.395	16.227	16.044

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$W\sqrt{S}/S = 152.741$$

$$\rho_{in}/\rho_0 = 1.2105$$

## 360° DEGREE RADIAL DISTORTION

POINT NUMBER 243.

## CRUISE CONFIGURATION

## WALL STATIC

CIRC. LOC. DEG.	STATION 0		CIRC. LOC. DEG.	STATION 1		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB		TIP	HUB		TIP	HUB		TIP	HUB
45	14.047	14.121	3	13.866		10	*	14.760	45	15.975	15.742
135	14.055	14.115	102	13.841	13.992	94.5	16.363	14.817	99	16.173	15.733
225	14.029	14.111	197.5	13.852		180	15.953	14.815	193.5	16.060	15.757
315	14.031	14.118	286.5	13.844	14.011	270	16.137	14.801	306	16.159	15.852

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	559.310	553.740	547.350	542.550	542.950
186	559.710	555.330	546.950	542.950	542.150
285	560.500	553.340	548.150	543.350	543.750
330		548.950	543.350		

## INLET TOTAL PRESSURE

## STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.337	14.413	14.686	14.681	14.695
99	14.386	14.429	14.690	14.672	14.687
189	14.376	14.380	14.708	14.700	14.692
279	14.358	14.407	14.699	14.689	14.699

## DISCHARGE TOTAL PRESSURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	18.020		17.202		16.575
231.0		17.706		17.018	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.905	16.209	16.499	16.133	15.813	16.087	16.300	16.182	15.965

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\sqrt{S} = 163.199$  $P_{ea}/P_0 = 1.1962$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 244.

## CRUISE CONFIGURATION

80% EQUIVALENT RATIO

SPFC

CIRC. LOC. DEC.	STATION TIP 0	STATION HUB	CIRC. LOC. DEG.	STATION TIP 1	STATION HUB	WALL STATICS	CIRC. LOC. DEG.	STATION TIP 2	STATION HUB	CIRC. LOC. DEG.	STATION TIP 2A	STATION HUB
45	13.923	14.023	3	13.675			10	*	14.481	45	15.610	15.222
135	13.931	14.027	102	13.700	13.882		94.5	16.031	14.593	99	15.695	15.220
225	13.931	14.031	187.5	13.687			180	15.710	14.523	193.5	15.596	15.230
315	13.923	14.025	286.5	13.676	13.903		270	15.788	14.524	306	15.686	15.354

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. OC. EG.	10	30	50	70	90
51	554.210	549.820	544.230	541.020	541.020
86	556.200	551.020	543.830	540.210	541.820
85	556.500	551.820	547.420	542.220	541.420
30		547.820	543.430		

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. OC. DEG.	10	30	50	70	90
9	14.289	14.385	14.687	14.677	14.674
99	14.335	14.377	14.633	14.694	14.685
199	14.313	14.328	14.696	14.686	14.682
279	14.305	14.355	14.681	14.681	14.693

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	17.649		16.944	0.000	16.518
231.0		17.408		16.807	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.623	15.874	16.223	15.874	15.599	15.738	15.996	15.915	15.721

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\sqrt{\epsilon}/S = 1.7977$  $P_{\infty}/P_0 = 1.1577$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 240.

## CRUISE CONFIGURATION

80 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.			CIRC. LOC. DEG.			CIRC. LOC. DEG.			CIRC. LOC. DEG.		
STATION 0 TIP	STATION 0 HUB	STATION 1 TIP	STATION 1 HUB	STATION 2 TIP	STATION 2 HUB	STATION 2A TIP	STATION 2A HUB				
45	13.751	13.879	3	13.421		10	*	13.921	45	14.868	14.013
135	13.770	13.884	102	13.465	13.666	94.5	15.427	14.068	99	14.703	13.970
225	13.741	13.865	187.5	13.479		180	15.203	13.990	193.5	14.573	14.080
315	13.745	13.869	286.5	13.401	13.686	270	15.124	14.013	306	14.671	14.216

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	549.170	543.560	539.130	536.700	535.480
186	548.310	546.770	540.340	535.080	535.890
285	549.970	545.570	541.950	537.510	536.700
330		541.950			

## INLET TOTAL PRESSURE

STATION 0

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.159	14.267	14.675	14.567	14.678
29	14.247	14.289	14.682	14.692	14.673
189	14.230	14.238	14.701	14.693	14.694
279	14.221	14.274	14.687	14.694	14.701

## DISCHARGE TOTAL PRESSURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	17.234		16.488		15.992
231.0		16.766		16.301	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.067	15.181	15.348	15.327	15.151	15.171	15.314	15.367	15.138

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\bar{v}\theta/S = 190.760$  $\rho_{2A}/\rho_0 = 1.3597$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 237.

CIRC. LOC. DEG.	CRUISE CONFIGURATION		WALL STATICs	100% EQUIVALENT ROTOR SPEED		CIRC. LOC. DEG.	STATION 2A	
	STATION 0 TIP	HUB		STATION 1 TIP	HUB		TIP	HUB
45	13.588	13.775	3	13.174		10	*	14.872
135	13.583	13.777	102	13.169	13.574	24.5	17.569	14.894
225	13.561	13.756	187.5	13.155		180	16.826	15.043
315	13.586	13.766	286.5	13.155	13.614	270	17.097	15.021

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	577.890	577.050		558.480	555.670
186		579.580	564.470	558.880	554.870
285	577.470	575.390	567.270	559.680	558.480
330					

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.135	14.232	14.675	14.687	14.693
99	14.194	14.257	14.700	14.708	14.701
189	14.160	14.168	14.709	14.708	14.704
279	14.139	14.197	14.700	14.704	14.713

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
.213.0	20.365		18.790		17.395
231.0		19.781		18.441	

* (DEGREES)	351.	354	355.5	357	359	1.5.	4	6	9
	16.749.	17.344	17.698	17.229	16.513	16.970	17.461	17.288	17.026

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W_0/S = 197.640$  $P_{2A}/P_0 = 1.3502$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 238.

## CRUISE CONFIGURATION

100 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATIC		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATION 2A		
	TIP	HUB	LOC. DEG.	STATION 1 TIP HUB		TIP	HUB		TIP	HUB	
45	13.516	13.729	3	13.038	10	*	14.672	45	16.860	16.272	
135	13.532	13.728	102	13.060	13.535	94.5	17.482	14.760	99	16.919	16.289
225	13.481	13.704	197.5	13.071		180	16.681	14.788	193.5	16.727	16.313
315	13.509	13.704	286.5	13.095	13.565	270	16.875	14.780	306	16.889	16.392

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	571.140	559.930	553.940	553.540	
186	588.390	574.830	561.520	554.740	553.140
295	583.000	573.190	566.310	558.730	557.930
330					

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.139	14.230	14.661	14.687	14.698
99	14.165	14.213	14.701	14.711	14.716
189	14.130	14.143	14.715	14.705	14.709
279	14.104	14.184	14.683	14.692	14.697

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	20.247		18.655		17.544
231.0		19.655		18.353	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.619	17.088	17.588	17.059	16.417	16.796	17.295	17.178	16.718

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

 $W\sqrt{S} = 206.580$  $\rho_a/\rho_0 = 1.3204$ 

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 239.

## CRUISE CONFIGURATION

## 100% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATICS		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB	LOC. DEG.	TIP	HUB	TIP	HUB		TIP	HUB
45	13.441	13.637	3	12.947		10	*	45	16.225	15.606
135	13.432	13.650	102	12.948	13.371	94.5	17.010	99	16.334	15.593
225	13.428	13.628	197.5	12.977		180	16.335	193.5	16.113	15.604
315	13.435	13.635	286.5	12.918	13.415	270	16.402	306	16.312	15.815

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51		568.140	560.150	552.960	552.560
186	582.460	571.370	558.950	553.360	555.360
285	578.850	571.780	564.140	555.760	554.560
330					

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.027	14.109	14.648	14.689	14.687
99	14.104	14.197	14.716	14.684	14.715
189	14.084	14.070	14.740	14.731	14.721
279	14.063	14.154	14.709	14.708	14.729

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0	19.840		18.349		17.516
231.0		19.120		18.024	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.194	16.647	17.129	16.556	16.175	16.411	16.899	16.781	16.356

Table B-1. Basic Distortion Data 360-Degree Radial Distortion (Continued)

$$W\sqrt{\theta}/S = 221.680$$

$$\rho_{\infty}/\rho_0 = 1.2568$$

## 360 DEGREE RADIAL DISTORTION

POINT NUMBER 235.

CIRC. LOC. DEG.	CRUISE CONFIGURATION		WALL STATIC		100% EQUIVALENT		ROTOR SPEED		
	STATION 0 TIP HUB	CIRC. LOC. DEG.	STATION 1 TIP HUB	CIRC. LOC. DEG.	STATION 2 TIP HUB	CIRC. LOC. DEG.	STATION 2A TIP HUB		
45 13.139	13.403	3	12.550	10	*	13.451	45 14.660	13.673	
135 13.172	13.437	102	12.536	13.029	94.5	15.088	13.645	99 14.715	13.673
225 13.126	13.400	187.5	12.643	180	15.538	13.601	193.5	14.528	13.823
315 13.143	13.400	286.5	12.587	13.070	270	15.384	13.683	304 14.659	14.004

DISCHARGE TOTAL TEMPERATURE  
STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51 566.540	558.560	551.760	546.150	544.140	
135 567.340	562.540	552.560	545.750	544.950	
285 568.950	560.950	554.560	548.150	545.350	
	555.760				

55

INLET TOTAL PRESSURE  
STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9 13.891	14.009	14.654	14.702	14.699	
99 13.985	14.039	14.709	14.710	14.689	
189 13.936	13.965	14.732	14.706	14.712	
279 13.905	14.006	14.711	14.707	14.715	

DISCHARGE TOTAL PRESSURE  
STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
213.0 18.815			17.601		16.702
231.0	18.105			17.222	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.343	15.504	15.804	15.685	15.405	15.467	15.710	15.819	15.547

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion

 $\frac{W_0}{S} = 151.181$  $\frac{P_m}{P_0} = 1.195$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 293.

CIRC. LOC. DEG.	SLID. CONFIGURATION			WALL STATICS			70 % EQUIVALENT			INLET TOTAL		
	STATION 3 TIP HUB	CIRC. LOC. DEG.	STATION 1 TIP HUB	CIRC. LOC. DEG.	STATION 2 TIP HUB	CIRC. LOC. DEG.	STATION 2A TIP HUB					
45	14.105	14.156		3	13.788		10	*	15.571	45	16.218	15.367
135	14.178	14.266		102	14.220	14.308	94.5	16.298	15.231	99	16.167	15.923
225	14.113	14.237		187.5	14.002		180	16.931	15.234	193.5	16.198	15.942
315	14.012	14.105		286.5	13.960	14.238	270	16.077	15.315	306	16.125	15.706

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	560.829	595.222	590.791	548.337	541.452
135	550.866	547.594	544.303	541.261	543.084
225	540.743	546.743	543.593	542.576	542.576
315					

## INLET TOTAL PRESSURE

STATIC. 3

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	1.	30	50	70	90
9	14.340	14.361	14.293	14.265	14.388
99	14.387	14.704	14.701	14.705	14.712
189	14.709	14.705	14.707	14.702	14.699
279	14.686	14.690	14.693	14.701	14.698

## DISCHARGE TOTAL PRESSURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	17.379	17.124	16.754	16.550	16.368
204.5	17.579		17.166		16.922
226.5		17.427		16.953	

* (DECKLES)	351	334	330.3	357	359	1.5	4	6	9
	16.115	16.298	16.334	16.470	16.091	16.194	16.373	16.351	16.107

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W_{\sqrt{S}} = 160.324$  $\rho_a/\rho_0 = 1.172$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 296.

## SLTO CONFIGURATION

70% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION TIP HUB	WALL STATICS			CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB			
		CIRC. LOC. DEG.	STATION TIP HUB	STATION TIP HUB							
45	15.970	14.035	3	13.699	10	*	15.278	45	16.084	15.843	
135	14.087	14.191	102	14.052	14.223	94.5	16.172	15.128	99	16.095	15.823
225	14.055	14.124	187.5	13.915		180	15.963	15.154	193.5	16.031	15.821
315	13.937	14.051	286.5	12.871	14.189	270	15.977	15.245	305	15.954	15.512

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	557.694	554.076	549.229	545.575	524.572
186	549.229	545.981	543.946	541.497	542.314
230	548.417	545.168	543.538	541.497	542.314
333					

## INLET TOTAL PRESSURE

STATION 3

CIRC. LOC. DEG.	10	30	50	70	90
9	14.291	14.322	14.359	14.294	14.337
99	14.513	14.691	14.709	14.697	14.699
189	14.710	14.710	14.712	14.701	14.691
279	14.675	14.689	14.695	14.692	14.704

## DISCHARGE TOTAL PRESSURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	17.320	17.011	16.740	16.430	16.305
203.5	17.437		17.140		16.961
223.5		17.340		16.947	

% (DEGREES)	0.1	304	355.5	5.7	359	1.5	4	5	9
	15.947	13.140	16.209	16.107	15.930	16.055	16.238	16.178	15.913

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 180.243$  $P_{2A}/P_0 = 1.57$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 299.

## SLTO CONFIGURATION

70% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		MALL STATICS		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB	LOC.	STATION 1	TIP	HUB	TIP	HUB	TIP	HUB
45	13.724	13.825	3	13.460			10	*	14.824	
125	13.928	14.044	102	13.824	14.069		94.5	15.284	14.867	45
225	13.928	14.037	187.5	13.795			180	15.731	14.915	99
315	13.800	13.892	285.5	13.763	14.074		270	15.651	15.000	193.5
										306
										15.251
										15.027

## DISCHARGE TOTAL TEMPERATURE

STATION 2A  
PERCENT SPAN FROM TIP

## CIRC.

LOC.

DEG.

10

30

50

70

90

51

186

285

230

551.194

545.525

545.119

543.769

543.084

543.084

545.931

541.044

540.536

542.676

539.409

539.818

520.794

539.818

539.818

## CIRC.

LOC.

DEG.

10

30

50

70

90

9

99

199

279

14.173

14.701

14.701

14.692

14.249

14.715

14.714

14.695

14.242

14.713

14.707

14.690

14.213

14.717

14.704

14.704

14.227

14.718

14.707

14.700

## INLET TOTAL PRESSURE

STATION 0.  
PERCENT SPAN FROM TIP

## CIRC.

LOC.

DEG.

10

30

50

70

90

9

99

199

279

14.173

14.701

14.701

14.692

14.249

14.715

14.714

14.695

14.242

14.713

14.707

14.690

14.213

14.717

14.704

14.704

14.227

14.718

14.707

14.700

## DISCHARGE TOTAL PRESSURE

STATION 2A  
PERCENT SPAN FROM TIP

## CIRC.

LOC.

DEG.

10

30

50

70

90

42.5

296.5

226.5

17.061

17.197

17.099

16.852

16.999

16.828

16.577

16.327

16.828

16.225

16.793

## DISCHARGE TOTAL PRESSURE

STATION 2A  
PERCENT SPAN FROM TIP

## CIRC.

LOC.

DEG.

10

30

50

70

90

42.5

296.5

226.5

17.061

17.197

17.099

16.852

16.999

16.828

16.577

16.327

16.828

16.225

16.793

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.584	15.714	15.836	15.815	15.656	15.669	15.807	15.814	15.592

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 204.457$  $P_{20}/P_0 = 1.121$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 299.

## STATION CONFIGURATION

## 70% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION TIP HUB	WALL STATICS			CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB
		CIRC. LOC. DEG.	STATION TIP HUB	STATION TIP HUB				
45	13.377	13.300	3	13.104	10	*	45	14.720
135	13.691	13.692	102	13.531	13.800	94.5	13.098	14.297
225	13.658	13.626	187.5	13.521	13.819	18.	14.979	14.292
315	13.506	13.658	260.5	13.518	13.819	270	14.932	14.412

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51					
126	**				
255					
330					

## INLET TOTAL PRESSURE

STATION 0

CIRC. LOC. DEG.	10	30	50	70	90
3	13.017	14.048	14.079	14.062	13.913
99	14.709	14.723	14.724	14.711	14.722
139	14.717	14.719	14.720	14.709	14.709
279	14.700	14.695	14.704	14.712	14.716

## DISCHARGE TOTAL PRESSURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	16.335	16.167	16.111	15.954	15.747
208.5	16.422		16.486		16.520
226.5		16.453		16.523	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	14.688	14.955	15.016	15.041	14.905	14.925	15.005	15.037	14.897

\*\* Faulty Temperature Data; Efficiency Calculated From Extrapolated Temperature Data

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $N_{\infty}/N_0 = 163.415$  $\rho_{\infty}/\rho_0 = 1.232$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 306.

SLTD CONFIGURATION				WALL STATICS		80 % EQUIVALENT		ROTOR SPEED			
CIRC.	LOC.	STATION 0	CIRC.	LOC.	STATION 1	CIRC.	LOC.	STATION 2	CIRC.	LOC.	STATION 2A
DEG.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB
45	14.001	14.057	3	13.503		10	*	15.819	45	16.756	16.443
135	14.151	14.236	102	14.308	14.231	94.5	17.027	15.447	99	16.663	16.349
225	13.990	14.097	187.5	13.885		180	16.270	15.433	193.5	16.741	16.467
315	13.832	13.961	286.5	13.729	14.105	270	16.607	15.533	306	16.634	16.111

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	DEG.					
51	575.995	569.879	558.906	555.287	555.287	
184	563.707	556.296	552.867	549.224	551.250	
285	559.707	556.093	551.655	550.844	550.035	
330						

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	DEG.					
9	14.232	14.228	14.286	14.247	14.275	
99	14.699	14.704	14.706	14.711	14.707	
189	14.706	14.715	14.715	14.709	14.700	
279	14.692	14.703	14.697	14.710	14.710	

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	LOC.	10	30	50	70	90
	DEG.					
42.5	18.311	17.979	17.403	17.100	16.748	
208.5	18.447		17.952		17.649	
226.5		18.299		17.678		

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.704	16.953	17.007	17.040	16.633	16.797	17.086	17.056	16.649

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$\frac{H_{\text{ref}}}{H_0} = 180.565$$

$$\frac{\rho_{\text{ref}}}{\rho_0} = 1.231$$

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 309.

## SLTB CONFIGURATION

80 % EQUIVALENT ROTOR SPEED

## WALL STATICS

CIRC. LOC. DEG.	STATION 0 TIP	HUB	CIRC. LOC. DEG.			CIRC. LOC. DEG.			CIRC. LOC. DEG.		
			TIP	HUB	STATION 1 TIP	HUB	STATION 2 TIP	HUB	STATION 2A TIP	HUB	
45	13.786	13.896		3	13.363		10	*	15.582		45
135	13.949	14.055		102	13.929	14.110	94.5	16.634	15.291		99
225	13.847	13.950		187.5	13.668		180	16.418	15.315		193.5
315	13.720	13.828		286.5	13.435	14.034	270	16.425	15.433		306

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	570.545	564.976	558.971	553.329	552.520
186	556.959	554.137	550.495	548.827	548.465
285	556.557	553.329	548.058	547.651	548.455
330					

## INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.162	14.206	14.222	14.195	14.225
99	14.706	14.715	14.713	14.713	14.711
189	14.708	14.714	14.714	14.709	14.700
279	14.587	14.596	14.692	14.691	14.693

## DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	18.227	17.864	17.338	17.018	16.777
208.5	18.492		17.933		17.535
226.5		18.240		17.671	

* (DEGREES)	351	364	355.5	357	359	1.5	4	6	9
	16.452	16.456	16.754	16.777	16.443	16.548	16.821	16.833	16.427

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$W\sqrt{S} = 200.927$$

$$\rho_{in}/\rho_0 = 1.221$$

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 312.

## SLTO CONFIGURATION

## 80% EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATICS					CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB	CIRC. LOC. DEG.	STATION 1 TIP	HUB	CIRC. LOC. DEG.	STATION 2 TIP	HUB	TIP	HUB
45	13.475	13.589	3	13.074		10	*	15.100	45	16.202
135	13.733	13.846	102	13.556	13.909	94.5	16.417	15.014	99	16.187
225	13.689	13.820	197.5	13.453		180	16.166	15.075	193.5	16.092
315	13.512	13.630	266.5	13.444	13.966	270	16.149	15.205	306	16.001

DISCHARGE TOTAL TEMPERATURE  
STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	564.868	562.256	555.581	552.735	552.725
186	555.986	552.328	549.879	547.835	547.835
295	555.581	551.511	549.879	547.835	547.835
330					

INLET TOTAL PRESSURE  
STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.010	14.075	14.092	14.058	14.082
90	14.397	14.709	14.707	14.705	14.713
189	14.710	14.718	14.709	14.710	14.701
279	14.682	14.688	14.687	14.698	14.700

DISCHARGE TOTAL PRESSURE  
STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	18.048	17.730	17.271	16.867	16.654
208.5	18.222		17.831		17.539
226.5		17.995		17.594	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.059	16.232	16.382	16.423	16.149	16.220	16.419	16.412	16.098

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$W\sqrt{\rho} = 229.474$$

$$\rho_{in}/\rho_0 = 1.163$$

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 302.

## SLTD CONFIGURATION

## 80% EQUIVALENT ROTOR SPEED

CIRC.	ALL STATIONS			CIRC.	ALL STATIONS			CIRC.	ALL STATIONS		
	LOC.	STATION 1	LOC.		LOC.	STATION 2	LOC.		LOC.	STATION 2	LOC.
LOC.	TIP	MID	LOC.	TIP	MID	LOC.	TIP	MID	LOC.	TIP	MID
45	12.923	12.109	3	12.549		10	*	13.902	45	14.715	14.497
135	13.371	13.360	102	12.174	13.536	94.5	15.237	14.218	99	14.627	14.378
225	13.360	13.359	137.5	13.161		130	15.196	14.152	193.5	14.429	14.111
315	13.130	12.321	295.5	13.114	13.545	270	14.071	14.350	306	14.439	13.565

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC.	LOC.	DEG.	10	30	50	70	90
		51	554.824	550.844	544.344	546.788	5-8.007
		180	545.150	542.711	543.120	542.302	542.711
		285	545.150	543.120	542.711	543.120	543.120
		330					

## INLET TOTAL PRESSURE

## STATION 3

## CIRC. PERCENT SPAN FROM TIP

CIRC.	LOC.	DEG.	10	30	50	70	90
		8	13.729	13.805	13.853	13.829	13.829
		90	14.600	14.591	14.718	14.541	14.730
		199	14.721	14.731	14.722	14.705	14.700
		279	14.682	14.706	14.698	14.696	14.706

## DISCHARGE TOTAL PRESSURE

## STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC.	LOC.	DEG.	10	30	50	70	90
		42.5	16.624	16.615	16.565	16.154	16.002
		205.5	16.979		17.007		17.007
		226.5		16.971		17.005	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	14.945	15.022	15.142	15.152	15.036	14.993	15.119	15.117	14.892

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 212.396$  $P_{in}/P_0 = 1.379$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 330.

CIRC. LOC. DEG.	STATION TIP	HUB	SLTO CONFIGURATION		WALL STATICS		ICFS EQUIVALENT		ROTOR SPEED		
			CIRC. LOC. DEG.	STATION TIP	HUB	CIRC. LOC. DEG.	STATION TIP	HUB	CIRC. LOC. DEG.	STATION TIP	
45	13.498	13.577		3	12.412		10	*	16.524	45	17.841
135	13.741	13.861		102	13.894	13.935	24.5	18.259	15.792	99	17.567
225	13.365	13.535		187.5	13.033		180	17.203	15.718	193.5	17.829
315	13.123	13.328		226.5	12.181	13.520	270	17.756	15.904	306	17.809

DISCHARGE TOTAL TEMPERATURE  
STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	606.777	595.598	583.103	576.398	579.558
126	584.677	575.606	568.048	566.049	567.649
285	585.005	574.313	569.245	566.449	565.649
330					

INLET TOTAL PRESSURE  
STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.917	13.920	13.977	13.913	13.970
99	14.602	14.598	14.704	14.708	14.712
189	14.721	14.711	14.721	14.721	14.720
279	14.650	14.692	14.692	14.705	14.700

DISCHARGE TOTAL PRESSURE  
STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	20.555	19.807	19.876	19.193	17.538
202.5	21.150		19.935		19.195
226.5		20.491		19.446	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	17.779	19.302	19.507	19.503	17.830	19.094	19.592	19.591	18.077

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$W\sqrt{\theta}/S = 238.635$$

$$\rho_{\infty}/\rho_0 = 1.366$$

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 326.

## STATION CONFIGURATION

## WALL STATICS

CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB
45	12.965	13.149	3	12.180	10	*	15.912
135	13.262	13.452	102	13.053	13.567	94.5	17.707
225	13.131	13.358	197.5	12.755	-	190	17.242
315	12.914	13.092	216.5	12.740	13.422	270	17.234

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	599.794	599.309	579.104	572.372	572.769
135	579.293	571.179	565.199	561.979	563.586
225	581.075	573.392	567.190	562.783	565.189
315					

## INLET TOTAL PRESSURE

## STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.704	13.784	13.793	13.753	13.798
99	14.625	14.711	14.701	14.713	14.713
139	14.706	14.724	14.714	14.724	14.707
279	14.662	14.671	14.697	14.695	14.708

## DISCHARGE TOTAL PRESSURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	20.639	19.615	19.741	18.250	17.522
135	20.663		19.769		19.119
225		20.033		19.351	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	17.280	17.710	18.003	17.849	17.260	17.474	17.681	17.921	17.307

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 255.577$  $P_{in}/P_0 = 1.334$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 323.

CIRC. LOC. DEG.	SLTO CONFIGURATION		WALL STATICS		100 % EQUIVALENT ROTOR SPEED						
	STATION 0 TIP	HUB	CIRC. LOC. DEG.	STATION 1 TIP	HUB	CIRC. LOC. DEG.	STATION 2 TIP	HUB	CIRC. LOC. DEG.	STATION 2A TIP	HUB
45	12.5220°	12.723	3	11.913		10	*	15.093	45	16.853	16.286
125	13.0280°	13.220	132	12.710	13.227	94.5	17.149	14.978	99	16.756	16.191
225	12.9730°	13.175	187.5	12.624		180	16.684	15.042	193.5	16.565	16.112
315	12.7200°	12.309	296.5	12.615	13.209	270	16.547	15.540	306	16.487	15.333

DISCHARGE TOTAL TEMPERATURE  
STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	592.712	590.985	571.101	567.516	567.915
126	576.253	574.516	552.519	559.904	560.306
225	576.253	567.117	563.918	561.110	560.306
300					

961

INLET TOTAL PRESSURE  
STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.474	12.595	13.578	13.570	13.579
99	14.698	14.715	14.721	14.715	14.711
189	14.722	14.715	14.717	14.726	14.711
279	14.659	14.582	14.703	14.696	14.697

DISCHARGE TOTAL PRESSURE  
STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	19.914	19.293	19.459	17.883	17.462
208.5	19.939		19.479		19.051
226.5		19.453		19.119	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.534	16.929	17.311	17.122	16.550	16.801	17.142	17.109	16.625

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 273.421$  $P_{in}/P_0 = 1.238$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 320.

## SLTO CONFIGURATION

100 % EQUIVALENT REASON SITES

CIRC.	WALL STATICS			CIRC.	CIRC.			CIRC.	STATION 2A		
	LOC.	STATION 0	STATION 1		LOC.	STATION 1	STATION 2		LOC.	STATION 2	STATION 2A
LOC.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB
45	11.970	12.146	3	11.418		10	*	13.397	45	14.755	14.247
135	12.792	12.992	102	12.474	12.866	94.5	15.341	14.311	99	14.550	14.104
225	12.751	12.996	187.5	12.490		180	15.122	13.941	193.5	14.251	13.756
315	12.413	12.635	286.5	12.486	12.878	270	15.065	15.098	306	14.280	12.893

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	10	30	50	70	90
51	577.659	568.163	565.375	561.777	558.971
135	562.570	555.751	555.751	554.341	555.751
285	562.178		556.557	556.959	557.361
230					

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC.	10	30	50	70	90
9	13.182	13.306	13.342	13.341	13.342
99	14.669	14.710	14.710	14.714	14.727
189	14.742	14.742	14.727	14.718	14.705
279	14.637	14.657	14.683	14.707	14.700

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC.	10	30	50	70	90
42.5	17.721	17.349	17.468	16.953	16.542
203.5	17.938		18.043		18.318
226.5		17.527		18.346	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	14.929	15.076	15.480	15.273	14.967	15.033	15.113	15.209	14.709

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $N\sqrt{S} = 123.676$  $\rho_{in}/\rho_0 = 1.150$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

CIRC.	CRUISE CONFIGURATION			WALL STATICs			70 % F T-EQUIVALENT	ROT.SR	SPEED
	LOC.	STATION 0 TIP	HUB	LOC.	STATION 1 TIP	HUB			
DEG.				DEG.			DEG.		
45	14.284	14.303		3	14.056		10	*	14.995
135	14.376	14.396		102	14.351	14.291	24.5	16.134	14.877
225	14.322	14.356		187.5	14.219		180	15.708	14.871
315	14.278	14.315		280.5	14.123	14.246	270	15.393	14.923

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

CIRC.	PERCENT SPAN FROM TIP				
	LOC.	10	30	50	70
DEG.					90
51	513.130	530.409	545.210	540.283	538.767
186	548.013	546.012	540.736	537.959	536.744
205	547.614	546.813	541.994	539.171	539.171
330					

## INLET TOTAL PRESSURE

## STATION 0

CIRC.	PERCENT SPAN FROM TIP				
	LOC.	10	30	50	70
DEG.					90
9	14.448	14.483	14.479	14.473	14.481
99	14.684	14.628	14.533	14.677	14.694
139	14.692	14.705	14.698	14.693	14.683
278	14.696	14.692	14.693	14.691	14.702

## DISCHARGE TOTAL PRESSURE

## STATION 2A

CIRC.	PERCENT SPAN FROM TIP				
	LOC.	10	30	50	70
DEG.					90
42.5	17.300	17.019	16.748	16.011	15.730
213.0	17.192		16.647		16.248
231.0		17.043		16.602	

*	(DEGREES)	261	334	353.5	357	359	1.5	4	6	9
		15.107	15.997	16.025	15.939	15.725	15.899	16.080	15.969	15.861

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$W\sqrt{\theta}/S = 133.653$$

$$\rho_{in}/\rho_0 = 1.143$$

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 283.

## CRUISE CONFIGURATION

70% FLOW VEL.: 15.728 SPEED

CIRC. LOC. DEG.	STATION 0		ALL STATICS		STATION 2		CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB	LOC. DEG.	STATION 1 TIP HUB	LOC. DEG.	TIP HUB		TIP	HUB
45	14.185	14.211	3	13.959	10	*	45	15.800	15.490
135	14.305	14.332	102	14.196 14.213	94.5	15.924 14.801	99	15.772	15.453
225	14.277	14.330	187.5	14.157	180	15.678 14.777	193.5	15.660	15.428
315	14.221	14.264	286.5	14.125 14.200	270	15.768 14.783	306	15.728	15.514

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	549.083	549.286	542.696	539.471	537.859
136	545.691	544.291	539.874	536.647	536.243
285	545.491	544.690	541.884	538.262	537.859
330					

## INLET TOTAL PRESSURE

STATION 0

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.420	14.445	14.452	14.443	14.448
99	14.603	14.625	14.635	14.690	14.687
189	14.696	14.699	14.700	14.691	14.687
279	14.577	14.689	14.689	14.689	14.688

## DISCHARGE TOTAL PRESSURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	17.238	16.926	16.630	16.365	15.679
213.0	17.128		16.579		16.270
231.0		16.965		16.512	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.675	15.864	15.910	15.802	15.585	15.757	15.912	15.838	15.695

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

~~NV8/S 8 140876~~~~Psi/Po = 1.137~~

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 286.

## CRUISE CONFIGURATION

70 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATICs		STATION 2		STATION 2A				
	TIP	HUB	CIRC. LOC. DEG.	STATION 1 TIP HUB	CIRC. LOC. DEG.	TIP HUB	CIRC. LOC. DEG.	STATION 2A TIP HUB			
45	14.097	14.150	3	13.913	10	*	14.536	45	15.559	15.246	
135	14.256	14.317	102	14.099	14.154	94.5	15.912	14.706	99	15.519	15.168
225	14.254	14.310	187.5	14.110	180	15.586	14.670	193.5	15.439	15.163	
315	14.181	14.233	288.5	14.077	14.151	270	15.611	14.675	306	15.511	15.324

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

CIRC. LOC. DEG.	PERCENT SPAN FROM TIP				
	10	30	50	70	90
51	547.614	546.813	542.800	539.576	538.363
136	545.210	543.603	539.979	537.554	537.554
285	545.210	543.202	541.189	537.959	537.959
330					

## INLET TOTAL PRESSURE

## STATION 0

CIRC. LOC. DEG.	PERCENT SPAN FROM TIP				
	10	30	50	70	90
9	14.388	14.431	14.426	14.408	14.415
99	14.390	14.698	14.696	14.702	14.700
139	14.712	14.708	14.704	14.695	14.695
279	14.637	14.697	14.593	14.701	14.702

## DISCHARGE TOTAL PRESSURE

## STATION 2A

CIRC. LOC. DEG.	PERCENT SPAN FROM TIP				
	10	30	50	70	90
42.5	17.159	16.820	16.429	16.251	15.869
213.0	17.014		16.516		16.190
231.0		16.825		16.415	

* (DEGREES)	351	294	355.5	357	359	1.5	4	9
	15.494	15.576	15.736	15.661	15.438	15.590	15.735	15.676

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$W\sqrt{\theta}/S = 159.309$$

$$\rho_{in}/\rho_0 = 1.102$$

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 276.

## CRUISE CONFIGURATION

70% EQUIVALENT ROLL SIZED

CIRC.	WALL STATICS			CIRC.			CIRC.				
	LOC.	STATION 3	LOC.	STATION 1	LOC.	STATION 2	LOC.	STATION 2A	LOC.	STATION 2A	
DEG.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB
45	13.920	13.955	3	13.953		10	*	14.089	45	14.612	14.273
135	14.110	14.195	102	13.934	13.998	94.5	15.258	14.284	99	14.665	14.103
225	14.127	14.153	187.5	13.954		180	15.099	14.225	193.5	14.157	14.186
315	14.048	14.032	266.5	13.921	14.002	270	15.047	14.309	306	14.658	14.323

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPA. FROM TIP

CIRC.	10	30	50	70	90
51	542.449	540.024	537.998	535.561	538.404
136	536.404	533.781	534.140	532.502	532.709
225	537.187	537.187	535.561	533.525	533.525
310					

## INLET TOTAL PRESSURE

STATION 3

## PERCENT SPA. FROM TIP

CIRC.	10	30	50	70	90
9	14.206	14.370	14.333	14.327	14.325
99	14.304	14.701	14.700	14.692	14.707
132	14.707	14.714	14.709	14.707	14.694
279	14.691	14.688	14.691	14.701	14.697

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPA. FROM TIP

CIRC.	10	30	50	70	90
42.5	16.484	16.169	15.903	15.739	16.484
213.0	16.404		16.101		15.765
231.0		16.295		16.007	

* (DEGREES)	351	354	355.5	357	359	1.5	4		
	14.915	15.010	15.050	15.057	14.938	14.996	15.102	15.106	14.999

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$$W\sqrt{\theta}/S = 143.648$$

$$\rho_{in}/\rho_0 = 1.198$$

90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 267.

CRUISE CONFIGURATION

80% EQUIVALENT MOTION SPEED

CIRC. LOC. DEG.	STATION 0		ALL STATICS		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATIC. 2A	
	TIP	HUB	LOC. DEG.	STATION 1 TIP HUB		TIP	HUB		TIP	HUB
45	14.133	14.174	3	13.806	10	*	15.056	45	16.305	15.879
135	14.262	14.319	102	14.261	14.176	94.5	16.560	99	16.354	15.939
225	14.182	14.264	197.5	14.044		180	15.979	193.5	16.139	15.836
315	14.127	14.159	286.5	13.608	14.105	270	16.217	306	16.217	15.921

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	563.053	558.284	552.231	544.613	543.507
105	559.879	557.895	547.953	542.997	542.184
193	556.308	552.281	549.416	545.023	545.023
320					

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.379	14.383	14.409	14.395	14.408
99	14.696	14.695	14.687	14.703	14.704
182	14.726	14.715	14.716	14.701	14.697
279	14.697	14.703	14.693	14.695	14.706

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	18.251	17.774	17.360	16.278	15.987
213.0	17.960		17.260		16.732
231.0		17.816		17.143	

* (DEGREES)	251	354	355.5	357	359	1.5	4	6	9
	16.112	16.361	16.392	16.357	16.037	16.242	16.499	16.369	16.182

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

$W\sqrt{S}/S = 151.692$

$P_{EA}/P_0 = 1.174$

90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 270.

CRUISE CONFIGURATION

80% EQUIVALENT REYNOLDS SPEED

CIRC.	CIRC.		CIRC.		CIRC.		CIRC.	
LOC.	STATION 0		LOC.	STATION 1		LOC.	STATION 2	
DEG.	TIP	HUB	DEG.	TIP	HUB	DEG.	TIP	HUB
45	14.042	14.077	3	13.739		10	*	14.848
135	14.172	14.233	102	14.048	14.082	94.5	16.311	14.804
225	14.152	14.216	187.5	13.982		180	15.978	14.807
315	14.090	14.130	286.5	12.941	14.064	270	16.090	14.792

DISCHARGE TOTAL TEMPERATURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	10	30	50	70	90
51	559.409	558.612	551.015	546.990	544.971
136	555.022	552.219	545.586	542.135	541.729
285	550.212	548.199	547.796	543.756	543.756
330					

INLET TOTAL PRESSURE

STATION 0

PERCENT SPAN FROM TIP

CIRC.	10	30	50	70	90
9	14.340	14.369	14.380	14.351	14.371
99	14.689	14.697	14.694	14.694	14.691
189	14.731	14.703	14.709	14.702	14.691
279	14.892	14.681	14.697	14.698	14.692

DISCHARGE TOTAL PRESSURE

STATION 2A

PERCENT SPAN FROM TIP

CIRC.	10	30	50	70	90
42.5	13.143	17.675	17.288	16.558	15.925
213.0	17.239		17.232		15.728
231.0		17.736		17.054	

* (DEGREES)	0.51	364	225.5	357	359	1.5	4	6	9
	15.994	16.223	16.322	16.265	16.904	16.103	16.348	16.251	16.052

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 163.837$  $\rho_{in}/\rho_0 = 1.174$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 273.

## CRUISS CONFIGURATION

80% FLOW VALVE, MAX SPEED

CIRC. LOC. DEG.	STATION TIP HUB	ALL STATICS				CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB	
		CIRC. LOC. DEG.	STATION TIP HUB	CIRC. LOC. DEG.	STATION TIP HUB					
45	13.903	13.919		3	13.581		10	*	14.384	
135	14.119	14.136		102	13.835	13.967	94.5	13.035	14.621	45
225	14.102	14.148		187.5	13.890		180	13.779	14.534	99
315	14.049	14.051		266.5	13.856	13.973	270	13.786	14.590	193.5
										306
										15.278

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	554.879	532.584	546.433	544.059	542.444
185	551.685	548.02	544.059	540.827	541.232
260	548.433	547.274	545.475	542.040	541.232
330					

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.285	14.299	14.316	14.298	14.311
99	14.701	14.701	14.708	14.708	14.693
189	14.717	14.707	14.713	14.709	14.703
279	14.649	14.645	14.575	14.709	14.713

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	17.008	17.342	16.905	16.669	16.176
213.0	17.619		16.992		16.574
231.0		17.387		16.872	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.618	15.846	15.921	15.840	15.559	15.730	15.921	15.894	15.685

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W\sqrt{S} = 180.057$  $\rho_{in}/\rho_0 = 1.139$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 263.

## CRUISE CONFIGURATION

80 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATICS		CIRC. LOC. DEG.	STATION 2		CIRC. LOC. DEG.	STATION 2A	
	TIP	HUB	CIRC. LOC. DEG.	STATION 1 TIP HUB		TIP	HUB		TIP	HUB
45	13.648	13.737	3	13.299		10	*	45	14.641	14.135
135	13.938	14.039	102	13.662	13.774	94.5	15.418	99	14.636	13.923
225	13.935	14.037	187.5	13.710		180	15.237	193.5	14.503	14.005
315	13.816	13.892	286.5	13.638	13.774	270	15.160	306	14.580	14.100

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	549.275	546.022	544.390	540.707	541.527
196	545.207	543.164	529.065	536.596	537.419
295	545.207	543.164	541.527	537.831	537.419
330					

## INLET TOTAL PRESSURE

STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.138	14.222	14.206	14.209	14.225
99	14.681	14.684	14.689	14.691	14.696
199	14.679	14.704	14.701	14.690	14.675
279	14.669	14.670	14.678	14.691	14.686

## DISCHARGE TOTAL PRESSURE

STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	17.027	16.607	16.355	16.036	15.685
213.0	17.136		16.588		16.392
231.0		16.820		16.378	

* (DEGREES)	331	254	355.0	357	359	1,5	4	6	9
	14.959	15.094	15.151	15.152	14.981	15.047	15.206	15.231	15.060

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $N_{\theta}/S = 180.848$  $\rho_{\infty}/\rho_0 = 1.324$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 254.

## CRUISE CONFIGURATION

100 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATICS		CIRC. LOC. DEG.		STATION 2		CIRC. LOC. DEG.		STATION 2A		
	TIP	HUB	LOC.	STATION 1	TIP	HUB	LOC.	STATION 2	TIP	HUB	TIP	HUB	
45	13.802	13.841	3	13.078			10	*	15.554		45	17.210	16.495
135	14.005	14.065	102	13.929	13.888		94.5	17.748	14.975		99	17.196	16.595
225	13.829	13.937	187.5	13.485			180	16.636	14.915		193.5	16.900	16.457
315	13.734	13.815	286.5	13.378	13.724		270	17.112	15.095		306	17.087	16.674

DISCHARGE TOTAL TEMPERATURE  
STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	591.945	583.576	573.514	562.115	561.296
186	582.374	575.131	563.753	558.009	555.949
285	575.938	568.646	566.610	560.475	559.653
330					

INLET TOTAL PRESSURE  
STATION 0

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.167	14.240	14.214	14.188	14.222
99	14.690	14.704	14.710	14.701	14.704
189	14.716	14.709	14.712	14.711	14.694
279	14.681	14.690	14.698	14.707	14.704

DISCHARGE TOTAL PRESSURE  
STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	20.861	19.900	18.711	16.908	16.658
213.0	20.056		18.839		17.807
231.0		19.736		18.608	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	17.167	17.543	17.486	17.581	16.950	17.290	17.758	17.655	17.269

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

 $W/\theta/S = 192.870$  $P_{20}/P_0 = 1.313$ 

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 257.

## CRUISE CONFIGURATION

100% EQUIVALENT ROTOR SPAN

CIRC. LOC. DEG.	STATION 0		CIRC. LOC. DEG.		STATION 1		WALL STATICs CIRC. LOC. DEG.		STATION 2		CIRC. LOC. DEG.		STATION 2A	
	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB	TIP	HUB
45	13.586	13.655	3	12.903			10	*	15.069		45	16.874	16.217	
135	13.836	13.941	102	13.583	13.723		94.5	17.402	14.764		99	16.868	16.327	
225	13.756	13.877	187.5	13.362			180	16.705	14.730		193.5	16.578	16.102	
315	13.626	13.724	286.5	13.296	13.629		270	15.949	14.730		306	15.745	16.311	

## DISCHARGE TOTAL TEMPERATURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	585.237	591.218	571.504	562.508	559.214
186	577.991	570.690	561.686	555.494	554.666
285	573.536	571.911	565.379	558.388	557.563
330					

LL

## INLET TOTAL PRESSURE

STATION 0

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	14.087	14.143	14.133	14.110	14.149
99	14.695	14.703	14.706	14.709	14.720
199	14.706	14.709	14.712	14.700	14.700
279	14.690	14.703	14.701	14.707	14.711

## DISCHARGE TOTAL PRESSURE

STATION 2A

## CIRC. PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	20.647	19.616	18.806	17.025	16.399
213.0	19.989		18.704		17.846
231.0		19.583		18.464	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	16.796	17.179	17.215	17.301	16.686	16.944	17.417	17.368	16.969

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

*N-6/S 8 6/2/32**P<sub>20</sub>/P<sub>0</sub> = 1.271*

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 260.

## CRUISE CONFIGURATION

## 100 % EQUIVALENT ROTOR SPEED

CIRC. LOC. DEG.	STATION 0		WALL STATICS		CIRC. LOC. DEG.		STATION 2		CIRC. LOC. DEG.		STATION 2A	
	TIP	HUB	LOC. DEG.	TIP	HUB	LOC. DEG.	TIP	HUB	LOC. DEG.	TIP	HUB	
45	13.237	13.328	3	12.646		10	*	13.944	45	15.931	15.294	
135	13.644	13.762	102	13.148	13.391	94.5	16.718	14.373	99	15.881	15.098	
225	13.623	13.751	187.5	13.200		180	16.247	14.275	193.5	15.632	15.063	
315	13.463	13.557	286.5	13.138	13.397	270	16.227	14.403	306	15.755	15.298	

## DISCHARGE TOTAL TEMPERATURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	553.707	560.508	554.078	548.007	546.788
186	560.909	554.078	548.818	542.302	543.120
285	556.494	555.689	552.059	544.752	542.711
330					

## INLET TOTAL PRESSURE

## STATION 0

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.906	14.006	13.996	13.967	13.996
99	14.587	14.691	14.695	14.705	14.718
189	14.706	14.710	14.708	14.702	14.687
279	14.679	14.691	14.690	14.702	14.702

## DISCHARGE TOTAL PRESSURE

## STATION 2A

## PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	19.555	18.674	18.008	17.465	16.520
213.0	19.304		18.335		17.556
231.0		18.842		17.989	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.952	16.295	16.346	16.408	15.956	16.109	16.522	16.460	16.068

Table B-2. Basic Distortion Data 90-Degree Circumferential Distortion (Continued)

~~W<sub>0</sub>/S = 22.721~~~~Pn/P<sub>0</sub> = 1.223~~

## 90 DEGREE CIRCUMFERENTIAL DISTORTION

POINT NUMBER 250.

CIRC. OC. DEG.	CRUISE CONFIGURATION			WALL STATICS			100 % EQUIVALENT ROTOR SPEED				
	CIRC.		LOC.	STATION 1		CIRC.	LOC.	STATION 2			
	STATION 0	TIP HUB	DEG.	TIP HUB	DEG.	LOC.	STATION 2A	TIP HUB	DEG.		
45	12.998	13.125	3	12.414		10	*	13.191	45	14.664	13.961
135	13.514	13.628	102	12.983	13.196	94.5	15.894	13.816	99	14.627	13.617
225	13.482	13.635	187.5	13.061	.	180	15.635	13.759	193.5	14.412	13.735
315	13.317	13.407	286.5	12.959	13.213	270	15.484	13.940	306	14.509	13.913

DISCHARGE TOTAL TEMPERATURE  
STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
51	566.194	561.315	555.590	552.302	554.269
186	560.500	557.229	552.713	546.517	546.517
285	562.532	559.049	556.410	548.587	546.517
330					

INLET TOTAL PRESSURE  
STATION 0

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
9	13.834	13.937	13.906	13.899	13.906
99	14.630	14.706	14.708	14.714	14.717
199	14.715	14.714	14.718	14.704	14.697
279	14.682	14.697	14.596	14.708	14.706

DISCHARGE TOTAL PRESSURE  
STATION 2A

PERCENT SPAN FROM TIP

CIRC. LOC. DEG.	10	30	50	70	90
42.5	18.470	17.681	17.282	16.776	16.083
213.0	18.652		17.757		16.895
231.0		13.131		17.393	

* (DEGREES)	351	354	355.5	357	359	1.5	4	6	9
	15.106	15.396	15.802	15.551	15.207	15.295	15.547	15.596	15.280

APPENDIX C  
DERIVATION OF STALL MARGIN DEFINITION

The definition of the compressor stability or stall margin used herein is developed from continuity considerations. The model used for this development is comprised of a compressor stage and a flow restricting area downstream of the stage as shown schematically in figure C-1. At the flow restriction, the flow rate may be expressed as follows:

$$W = f_w (M_2) \times A_2 \times P_2 \times \frac{1}{\sqrt{T_2}} \quad (C-1)$$

where the quantity  $f_w (M_2) = \frac{W \sqrt{T_2}}{P_2 A_2}$ , a function of the local Mach number.

Expressing equation (C-1) in terms of the compressor inlet corrected air-flow yields

$$\frac{W \sqrt{\theta_1}}{\delta_1} = f_w (M_2) \times A_2 \times \frac{P_2}{P_1} \times \frac{1}{\sqrt{T_2/T_1}} \times \frac{2116}{\sqrt{518.6}} \quad (C-2)$$

or

$$\frac{P_2/P_1}{W \sqrt{\theta_1}} = \frac{\sqrt{T_2/T_1} \times \frac{\sqrt{518.6}}{2116}}{f_w (M_2) \times A_2} \quad (C-3)$$

-- This relationship may be depicted on the compressor map by considering the quantity on the right side of the equation to be the parameter as shown in figure C-2. The quantity  $\sqrt{T_2/T_1}$ , although clearly associated with the compressor, has been combined with the flow restriction associated quantities  $f_w (M_2)$  and  $A_2$  for simplicity. This measure is justified because the change in compressor pressure ratio,  $(P_2/P_1)$ , is much larger than the related change in the square root of the temperature ratio,  $(\sqrt{T_2/T_1})$ .

If the compressor, operating initially at point A in figure C-2, is caused to stall (point B) by changing the downstream flow restriction, the following equality may be written to express this change in operating point:

$$\left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]_B - \left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]_A \times 100 = \left[ \frac{\sqrt{T_2/T_1}}{f_w(M_2) \times A_2} \right]_B - \left[ \frac{\sqrt{T_2/T_1}}{f_w(M_2) \times A_2} \right]_A \times 100$$

$$\left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]_A$$

Thus, it may be noted that the percentage change in the flow restriction parameter required to change the compressor operating point from A to B, the stall limit, is equal to the percentage change in  $\left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]$  from A to B;

$$\left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]$$

and this quantity is therefore defined as the compressor stability margin

$$\left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]_B - \left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]_A \times 100 = SM$$

$$\left[ \frac{P_2/P_1}{W\sqrt{\theta_1}} \right]_A$$

In the case of the compressor characteristic denoted by points A', C' and B' of figure C-2, it may be noted that the same change in flow restriction area and/or  $f_w(M_2)$  that causes the compressor operation to shift from point A to point B will cause a shift from point A' to point C' and will not cause instability. At this speed a further increase is required to force operation to shift to point B' and cause stall. Thus, the stability margin on this speed line (based on point A') is greater than that on the former speed line (based on point A). This comparison illustrates an important quality of this definition of stability margin, in that it provides a means of equating both flow range and pressure rise capability with regard to their stabilization of compressor operation.

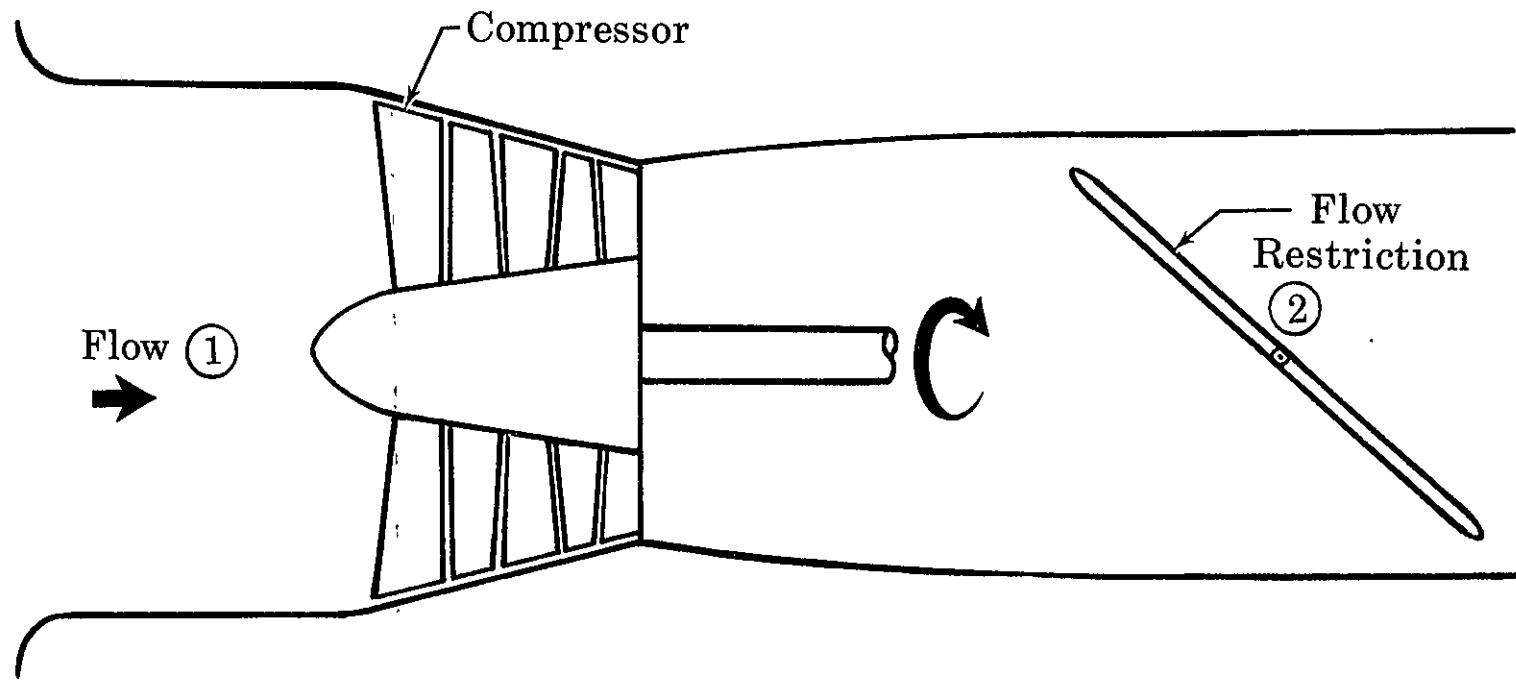


Figure C-1. Model for Defining Compressor Stability

FD 27383

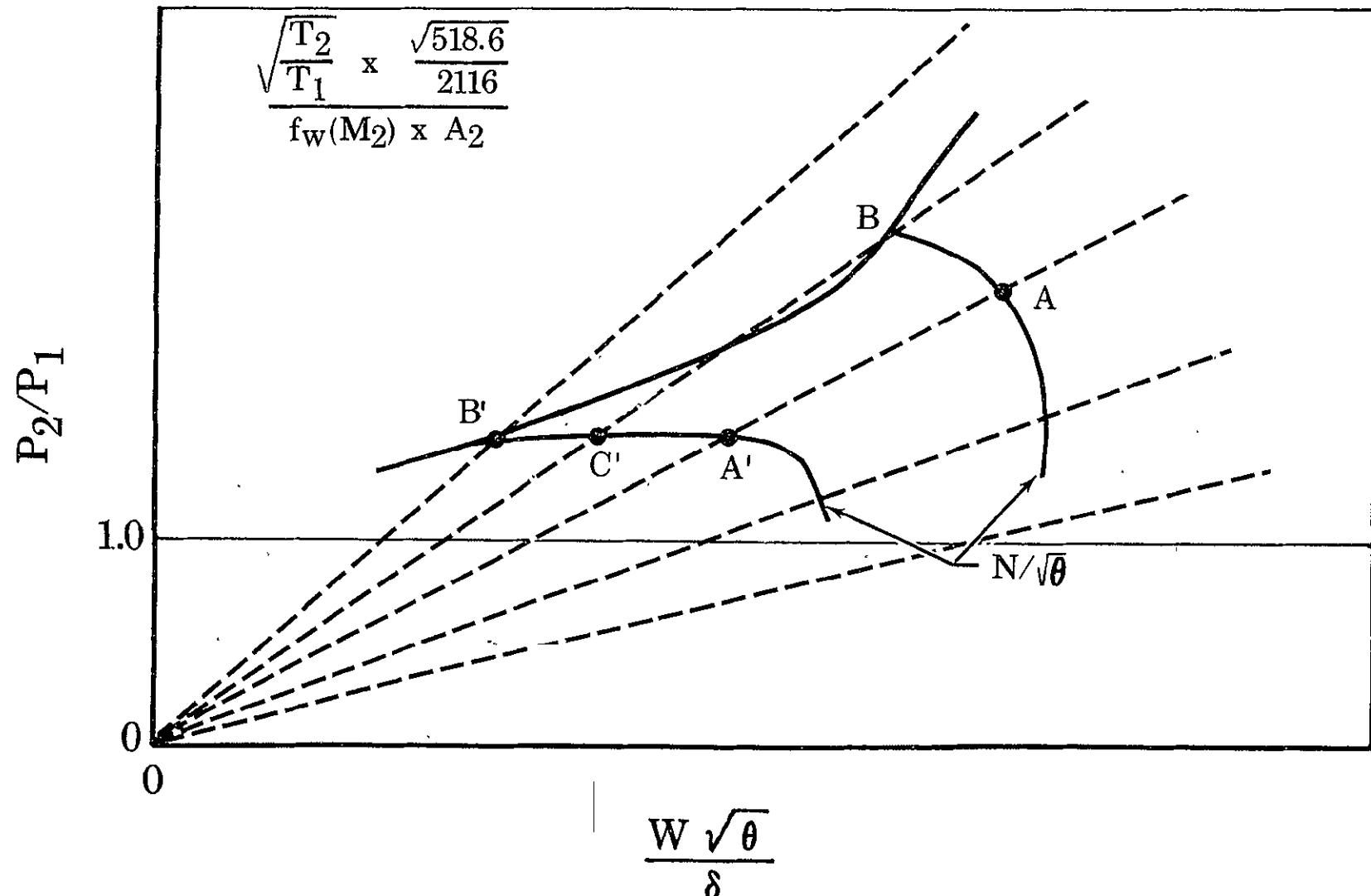


Figure C-2. Compressor Inlet Corrected Airflow

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